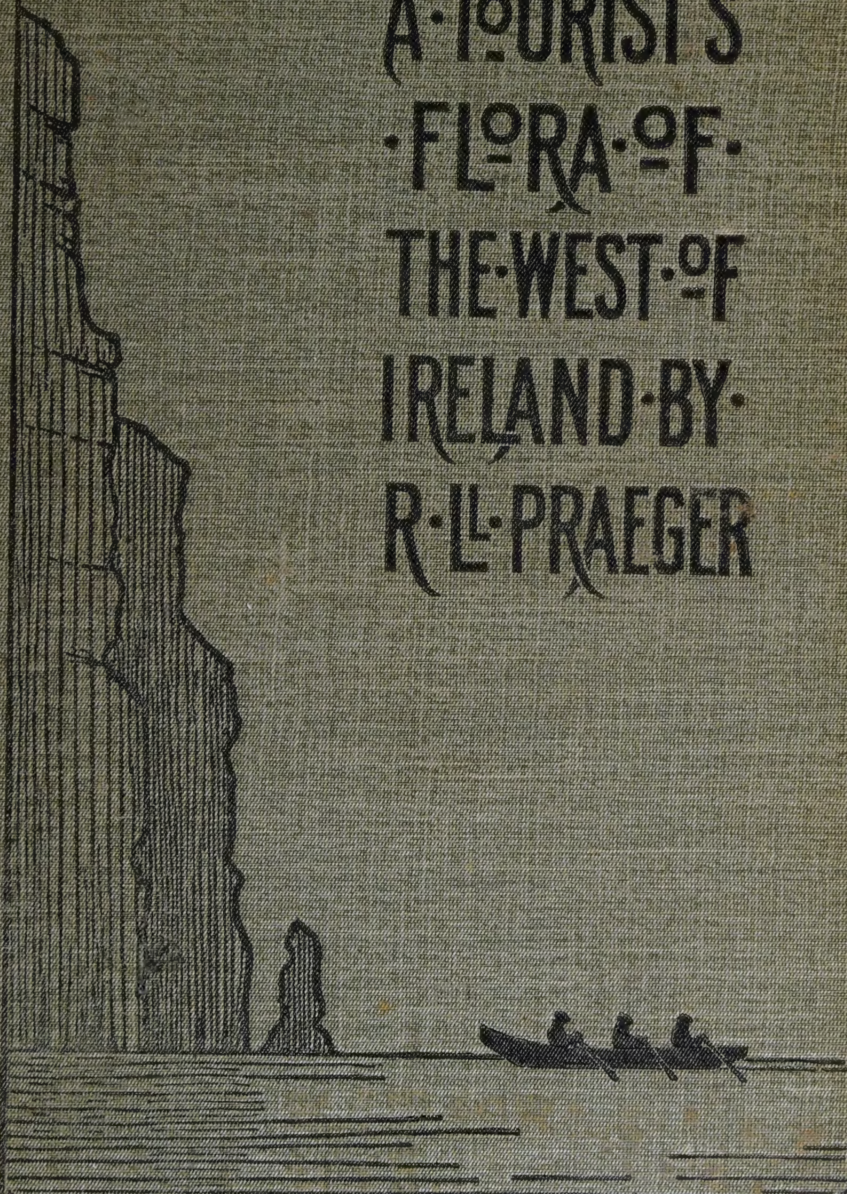
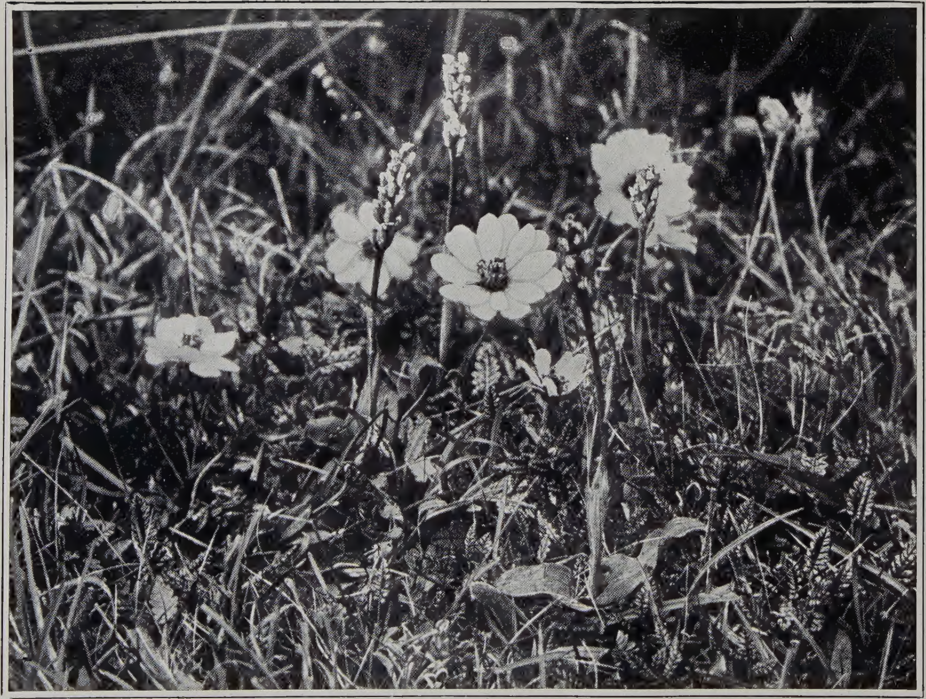
A·TOURIST'S
·FLORA·OF·
THE·WEST·OF
IRELAND·BY·
R·LL·PRAEGER





NORTHERN AND SOUTHERN PLANTS IN THE WEST OF IRELAND.
The alpine-arctic *Dryas octopetala* and the Mediterranean *Habenaria intacta* at Ballyvaughan,
Co. Clare. May, 1907.

R. Welch, Photo.

Frontispiece.

A TOURIST'S FLORA OF THE WEST OF IRELAND

BY

ROBERT LLOYD PRAEGER

DUBLIN:
HODGES, FIGGIS, AND CO., LTD.,
PUBLISHERS TO THE UNIVERSITY OF DUBLIN
1909

PRINTED AT THE UNIVERSITY PRESS, DUBLIN,
BY PONSONBY AND GIBBS

TO

M. P.

DUTIFULLY INSCRIBED

How many, ignorant of their own countrey, run eagerly into forreign regions, to ſearch out and admire whatever curioſities are to be found; many of which are much inferior to thoſe, which offer themſelves to our eyes at home.

LINNÆUS:
Oratio de Necessitate Peregrinationum intra Patriam. 1741.
Translated by BENJ. STILLINGFLEET.

I liſt not to tyre they patient Eares with unneceſſary Language . . . My mouth's no Dictionary . . . Moreover, I have gleaned ſome few meditations, obvious to the Hiſtorie . . . Vnderſtanding Reader, favour mee: Gently expound, what it is too late to correct.

'*He leva le Golpe, Dios ſea con ella.*'

FRANCIS QUARLES: A Feast for Wormes. 1638.

PREFACE

This book is compiled to suit the convenience of the itinerant rather than of the resident botanist—to serve as a "first aid" to the tourist who desires information, in a condensed form, respecting that peculiar flora which to the botanical student renders the West of Ireland one of the most interesting regions in Europe.

The work is divided into three Sections, each with its own index:—(1) Introduction, consisting of a general account of the district, and of its physical and botanical characters; (2) Topographical Section, containing brief accounts of the flora of over 100 selected areas, large and small, lying within the district; and (3) Systematic Section, giving the distribution of each species which occurs.

The plant-stations given have most of them been published already, in a host of reports and papers by various authors, which have been summarized mainly in "Cybele Hibernica" (2nd ed., 1898) and in "Irish Topographical Botany" (1901) and supplementary lists. To the original papers and to these larger works the reader must be referred for detailed information respecting finders, dates, and so on.

In addition, there are included the results of special work undertaken by the writer for the purposes of this book—examinations of a good many of the remoter areas, carried out during the years 1901-1908, of which reports have appeared from time to time in the "Irish Naturalist."

In dealing with each district, references are given to the principal sources of knowledge concerning its plants. The botanical tourist is more likely to require information respecting the flora of a neighbourhood than respecting the general distribution of a species. Therefore, I have enlarged the Topographical Section, and condensed the Systematic Section, which usually bulks so large in books of this kind. The scheme used in the Topographical Section necessarily involves a certain amount of repetition, but it is hoped that it will on this account the better fulfil its object, which is to give as rapidly as possible the information sought, without tedious references to other parts of the book.

The area included under the term West of Ireland has been chosen so as to join up Donegal in the north with Kerry and Cork in the south. As regards Donegal, an excellent flora already exists;[1] and the flora of the two southern counties mentioned has for some years engaged the attention of Dr. R. W. Scully and Mr. R. A. Phillips respectively; the full results of their successful researches, it is to be hoped, will be given to the public in due course.

Between Donegal and Kerry stretches an extensive tract of country, offering a wide variety of magnificent scenery, and a flora of singular interest. Of those plants which in the British Isles are found only in Ireland—and these include many of the most interesting species in the Britannic flora—three-quarters occur in this district, and one-half are confined thereto. The Burren, the Cliffs of Moher, Lough Derg, the Aran Islands, Connemara, Achill, Lough Gill, Ben Bulben, Lough Erne, are names widely known to both the scientific and the non-scientific. To the botanist these names suggest visions of alpine plants growing in sheets down to the edge of the Atlantic, of meadows filled with the Canadian "Blue-eyed Grass," of wild bogs clothed with beautiful Heaths unknown elsewhere in the British Isles, of limestone ledges bright with the blossoms of *Arenaria ciliata*, pools full of the curious flowers of the American Pipewort, and lake-shores starred with the golden heads of *Inula salicina*.

---

[1] H. C. HART: "Flora of the County Donegal." 1898. 7s. 6d.

A word as to the formal features of the Systematic Section. In the matter of nomenclature, the book is old-fashioned. The names used are almost without exception those employed in "Cybele Hibernica" and "Irish Topographical Botany," which are familiar ones to more than Irish readers. I might have adopted *in globo* the nomenclature of the "English Catalogue," 10th edition, but was warned off by the statement that "finality in the naming of many species would appear to be still some way off," as is indeed evident from the discrepancies between it and the companion lists of Rendle and Britten, and of Druce. We in Ireland dwell remote from the exhilarating sport of name-changing, and for my own part I am content to wait. But I have compromised by adding the London Catalogue names, where they differ from those employed. English names are added for the sake of those who find it easier to remember "Bristle-leaved Spike-rush" than *Scirpus setaceus*.

For the ugly and illiterate contractions used for the names of counties, I feel an apology is due. Considerations of space in the case of symbols of such constant occurrence were allowed to override the sense of grammatical propriety. The symbols *, ‡, †, are used as usual for plants established in our flora which are to be looked on as certainly, probably, or possibly introduced originally; and I have added a fourth symbol, §, to indicate non-established plants found wild—casuals, in other words, and chance escapes.

Many friends have helped me with this book, whom I cannot attempt to thank individually; but special acknowledgment is due to Mr. R. Welch, for infinite pains taken in the difficult department of plant-photography; to Mr. J. H. Lloyd, who has contributed the Irish forms and English meanings of the place-names, which are often of great interest when taken in connexion with the topography and history of the country; and to Mr. R. I. Best, who transcribed and revised the Irish names of the plants—taken mainly, it is needless to add, from "Cybele

Hibernica," which still remains the botanist's only safe refuge in this direction.

To the Council of the Royal Irish Academy, and to my fellow-editors of the "Irish Naturalist," I am indebted for the use of some of the cuts in the text.

R. Ll. P.

Lisnamae, Rathgar, Dublin,
March, 1909.

CONTENTS

PAGE

INTRODUCTION, ... , . 1

PHYSICAL DESCRIPTION—Extent—Size and Position—Coast-line—Rivers—Lakes—Mountains—Rocks and Soils—Climate . . 1

VEGETATIONAL SUBDIVISIONS—The Limestone Plain: Drift Area and Driftless Area—Galway-Mayo Highlands—Ben Bulben Plateau—Limestone Lake-shores—Coal-Measure Areas—Sandstone Hills—Factors other than Edaphic 7

PLANT FORMATIONS AND NATURAL GROUPS—Central Plain Grasslands—Central Plain Bogs—West Coast Bogs—Woods and Copses—Maritime Formations—Alpine Vegetation . . . 11

CHARACTER OF THE FLORA—Remarkable Features—South-west European Group—American Group 22

PROGRESS OF BOTANICAL INVESTIGATION 31

INDEX TO INTRODUCTION, ... 35

TOPOGRAPHICAL SECTION, ... 37

KEY-MAP, WITH REFERENCES, ... 38

COUNTY OF LIMERICK—West Limerick—Foynes—Askeaton Limestones — Askeaton — Limerick — Lough Gur—Adare — Castleconnell—Glenstal—Shannon Estuary—The Galtees, . . . 40

COUNTY OF CLARE—Monmor Bog and Loop Head—Kilkee—Ennis—Fergus Estuary—Slieve Bernagh—Killaloe—Central Clare Limestones — Lisdoonvarna — Cliffs of Moher — Burren Hills — Ballyvaughan—Aran Islands, ... 45

SOUTH-EAST GALWAY — Ardrahan Limestones — Lough Cooter—Slieve Aughty—Woodford—Lough Derg—Portumna—Athenry, 56

WEST GALWAY—Moycullen Limestones—Lough Corrib—Oughterard—Twelve Bens—Recess—Maam Turk—Maam—Kylemore and Benchoona—South-western Connemara—Roundstone—Renvyle—Inishbofin, ... 61

PAGE

North-east Galway—Galway City—Tuam—Ballinasloe, . . 70

County of Roscommon—Athlone—Lough Ree—Curlew Hills and Boyle Lakes—Roscommon—Castlereagh, ... 73

East Mayo—Cong and Clonbur—Lough Mask—Lough Carra, . . 77

West Mayo—Mweelrea Mountain-Group—Killery Harbour—Leenane—Maamtrasna or Partry Mountains—Croaghpatrick—Westport and Newport—Mallaranny—Curraun Achill—Nephin and Nephinbeg—Ballina—Killala—Lough Conn—Lough Cullin—Erris—Carrowmore Lake—The Mullet—Inishkea—Inishturk—Clare Island—Achill Island, ... 80

County of Sligo—Sligo Town—Lough Gill—Rosses Point—Ben Bulben Plateau—Knocknarea—Keshcorran and Carrowkeel—Inishmurray—Ox Mountains and Slieve Gamph, ... 94

County of Leitrim—Cuilcagh and Slieveanieran—Lough Allen—South Leitrim—Manorhamilton and Glenade—Lough Melvin, . 100

County of Fermanagh—Lough Macnean—Florencecourt—Lough Erne—Enniskillen—Poulaphuca and Carrick District, . . . 104

INDEX TO PLACE-NAMES, ... 109

SYSTEMATIC SECTION, ... 113

Ranunculaceæ to Characeæ, ... 113

INDEX TO PLANT-NAMES, ... 220

COLOURED MAPS.

Orographical Map of the West of Ireland, ... *To face* p. 3
Petrographical Map of the West of Ireland, ... ,, ,, 4
Connemara and Mayo Mountain District, ... ,, ,, 61
Sligo and Ben Bulben District, ... ,, ,, 9
General Map of the West of Ireland, ... *End of volume*

ILLUSTRATIONS.

Plate 1.—Habenaria intacta and Dryas octopetala, *To face title-page*
Fig. 1.—Summer and winter isotherms, ... p. 5
Plate 2.—Wind-blown Thorn, Co. Clare, ... *To face* p. 6
Fig. 2.—Daucus Carota from Inishkea, West Mayo, .. p. 6
Plate 3.—Denudation of limestone in Burren, ... *To face* p. 8
,, 4.—Dryas octopetala at Black Head, Co. Clare, .. ,, p. 19
Fig. 3.—Isophytic lines in the Britannic flora, .. p. 23
,, 4.—Distribution of Connacian plants, ... p. 25
Plate 5.—Saxifraga umbrosa, Mallaranny, Co. Mayo, .. *To face* p. 25
Fig. 5.—Distribution of Saxifraga umbrosa and Euphorbia hiberna, ... p. 26
Plate 6.—Eriocaulon septangulare, Cregduff Lough, Connemara, ... ,, p. 27
Fig. 6.—Key-map to Topographical Section, ... p. 38
Plate 7.—Scirpus triqueter by the Shannon at Limerick, *To face* p. 43
Fig. 7.—The Burren hills from near Galway, ... p. 52
Plate 8.—A hill-side in Burren, ... *To face* p. 54
,, 9.—On the shore of Lough Derg, ... ,, p. 59
,, 10.—Dabeocia polifolia at Roundstone, ... ,, p. 61
,, 11.—Among the Twelve Bens, Connemara, .. ,, p. 65
,, 12.—Cregduff Lough and Urrisbeg, Connemara, .. ,, p. 69
Fig. 8.—Wind-moulded wood, Lough Mask islands, .. p. 78
,, 9.—Section across Devenish, Lough Mask, .. p. 79

Plate 13.—Erica mediterranea at Mallaranny, Co. Mayo, .. *To face* p. 85
Fig. 10.—Clare Island from the north-east, ... p. 91
,, 11.—Sketch-map of Clare Island, ... p. 92
,, 12.—Sketch-map of Achill Island, ... p. 93
Plate 14.—Croaghaun, Achill Island, ... *To face* p. 94
Fig. 13.—Ben Bulben from the south, ... p. 97
Plate 15.—Entrance of Glencar, Co. Sligo, ... *To face* p. 98
Fig. 14.—Section across the Poulaphuca uplands, Co. Fermanagh, ... p. 108
Plate 16.—Arenaria ciliata and Ajuga pyramidalis, .. *To face* p. 126
,, 17.—Potentilla fruticosa at Ballyvaughan, Co. Clare, ,, p. 140
,, 18.—Saxifraga Sternbergii at Black Head, Co. Clare, ,, p. 145
,, 19.—Inula salicina on shore of Lough Derg, .. ,, p. 155
,, 20.—Erica Mackaii, Craigga More Lough, Connemara, ... ,, p. 163
Fig. 15.—Range of Dabeocia polifolia, Erica mediterranea, and E. Mackaii, ... p. 164
Plate 21.—Gentiana verna on sand-dunes, Ballyvaughan, Co. Clare, ... *To face* p. 168
Fig. 16.—Distribution of Euphrasia Salisburgensis, .. p. 173
Plate 22.—Euphrasia Salisburgensis at Dog's Bay, Connemara, ... *To face* p. 173
,, 23.—Pinguicula grandiflora, ... ,, p. 175
,, 24.—Euphorbia hiberna at Kenmare, ... ,, p. 182
Fig. 17.—Distribution of Habenaria intacta, . .. p. 189
Plate 25.—Sisyrinchium angustifolium at Woodford, .. *To face* p. 191
,, 26.—Glyceria festucæformis near Foynes, Co. Limerick, ,, p. 209
,, 27.—Adiantum Capillus-Veneris, Black Head, Co. Clare, ,, p. 212

INTRODUCTION.

CONTENTS.

PHYSICAL DESCRIPTION—Extent—Size and Position—Coast-line—Rivers—Lakes—Mountains—Rocks and Soils—Climate . . . 1
VEGETATIONAL SUBDIVISIONS—The Limestone Plain: Drift Area and Driftless Area—Galway-Mayo Highlands—Ben Bulben Plateau—Limestone Lake-shores—Coal-Measure Areas—Sandstone Hills—Factors other than Edaphic 7
PLANT FORMATIONS AND NATURAL GROUPS—Central Plain Grasslands—Central Plain Bogs—West Coast Bogs—Woods and Copses—Maritime Formations—Alpine Vegetation 11
CHARACTER OF THE FLORA—Remarkable Features—South-west European Group—American Group 22
PROGRESS OF BOTANICAL INVESTIGATION 31
INDEX 34

PHYSICAL DESCRIPTION.

EXTENT OF THE DISTRICT.

THE area dealt with in this book is mainly Ireland west of the Shannon; but, as the chief factor in determining boundaries has been the convenience of visitors to the west, and also the description of the vegetation of those parts of western Ireland which have not yet a "Flora" of their own, the line has been extended so as to include the Limerick district in the south, and the Enniskillen district in the north. The area thus defined comprises the counties of Limerick, Clare, Galway, Roscommon, Mayo, Sligo, Leitrim, and Fermanagh. A good deal of the Central Plain (in E. Mayo and Roscommon chiefly)—by no means a tourist district—is thus included; which has been done in order that the Shannon—now a tourist route—with its interesting lake-expansions and peculiar flora, may not be omitted.

SIZE AND POSITION.

The length of the area thus defined is 170 miles, extending in a north-easterly direction from Loop Head at the mouth of the Shannon; its greatest breadth, measured at right angles to this, is 108 miles; but the average breadth is 60 or 70 miles. The total area is 9928 square miles, or a little less than one-third (30½ per cent.) of the area of Ireland. The limits of latitude are from 52° 17′ N. in Limerick to 54° 38′ N. in

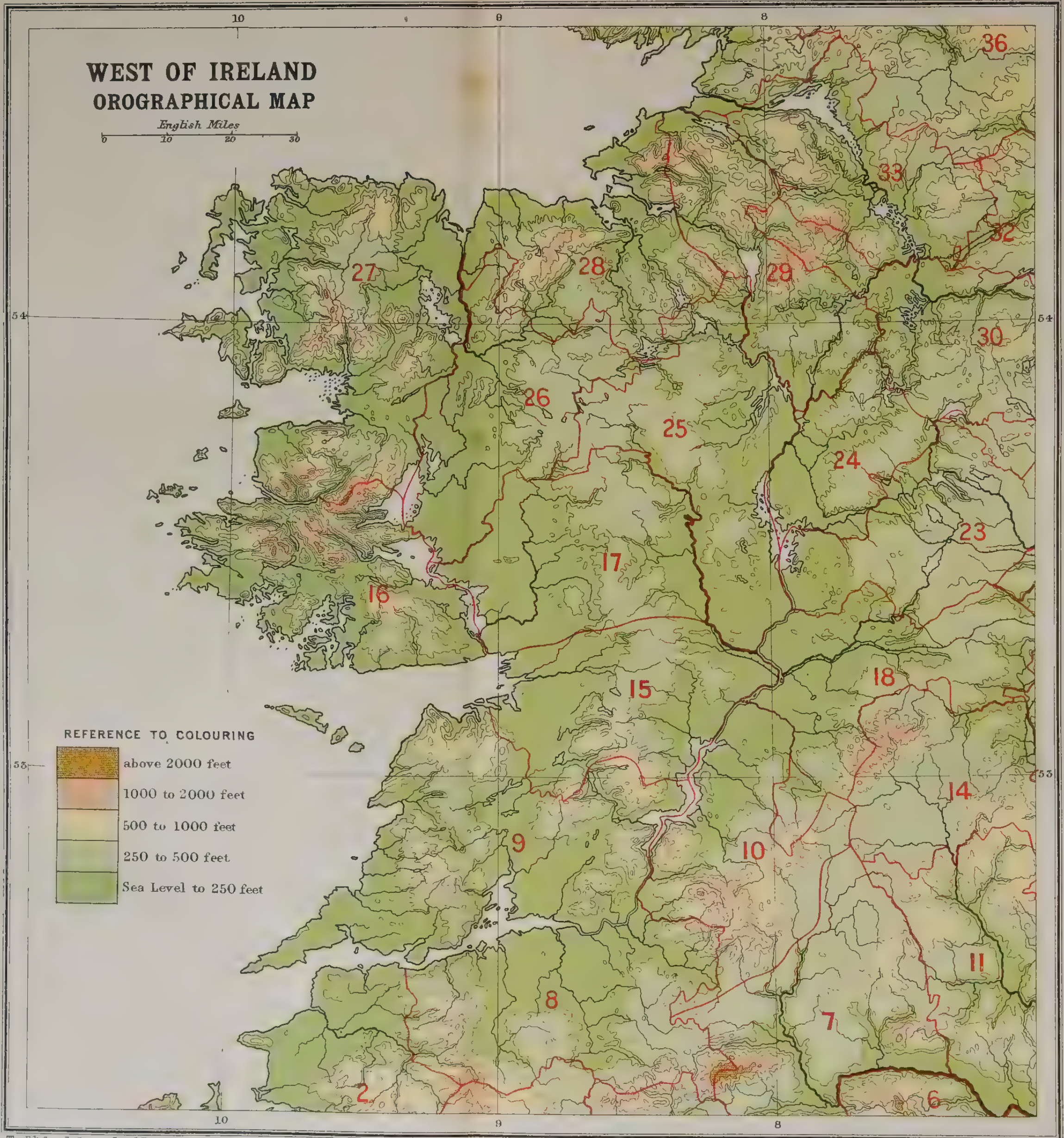
Fermanagh, and of longitude from 7° 10′ W. in Fermanagh to 10° 14′ W. in Galway. The general trend of the district is SW. and NE. The most westerly portion is the great Mayo-Galway buttress, which is the extreme western limit of the European continent excepting only the bold promontories of Kerry, which extend further into the Atlantic by nearly half a degree. A line drawn due south through the centre of the district strikes the coast of Portugal, the western limit of the continental land.

COAST-LINE.

The coast-line, which extends from the Shannon to Donegal Bay, is broken and irregular, low in parts, but usually bold, and in many places magnificently precipitous. The deeper indentations correspond with areas of low-lying limestone. The great metamorphic rock-mass of West Galway and West Mayo, stretching north and south for 75 miles, has resisted marine denudation; and its fretted coast stands boldly out, sentinelled with brown mountains, protecting the low grassy limestone plain in its rear. Islands of all sizes are numerous, the furthest being distant about 8 miles from the nearest point of mainland. In Galway and Mayo deep and tortuous sea-inlets abound.

RIVERS.

The Shannon, the largest river in the British Islands, 214 miles in length, which forms the eastern boundary of the greater part of the area, rises among the Cavan hills, and drops 186 feet in 10 miles to L. Allen. Thence it flows southward across the Limestone Plain for 130 miles, falling only 51 feet, and forming at intervals great lake-like expanses, with winding shores and numerous islands. At the lower end of L. Derg the river cuts through high hills of Old Red Sandstone and Silurian rocks, and drops 97 feet in 18 miles to reach sea-level at Limerick, whence for 55 miles more it forms a great estuary. The other rivers are small in comparison, the most important being the Erne, in the extreme north, which also forms great lakes, and drops suddenly to sea-level near the end of its course. The Moy and Corrib, flowing north and south respectively along the back of the Galway-Mayo mountain buttress, drain the chain of lakes that lie along the western edge of the Central Plain. They have no distinct flora apart from that of their lakes. To the Fergus also, which drains central Clare, this remark applies. The Suck, an important tributary of the Shannon, which drains much of the inland part of the district, and may once have been interesting botanically, has been so changed by



The Edinburgh Geographical Institute

J.G.Bartholomew.

drainage improvements that it is now little more than a ditch in the Boulder-clay. The same may be said of the Clare-Galway River.

LAKES.

Many large lakes, and innumerable small ones, lie within the district. Where the limestone of the plain abuts on the older metamorphic rocks of Galway and Mayo, a chain of large lakes is found—L. Corrib (27 miles long), L. Mask, L. Carra, and, further north, L. Conn and L. Cullin. The Shannon has a series of lake-like expansions upon its course—L. Allen near its source, L. Boderg and its neighbours, L. Ree (16 miles long), L. Derg (22 miles long). The Erne flows through the two large sheets of water which bear its name, the lower lake being 20 miles long. L. Melvin, south of L. Erne; the beautiful L. Gill near Sligo; L. Gara, L. Key, and L. Arrow near Boyle; and L. Carrowmore in NW. Mayo are among the other more important lakes. The smaller sheets of water especially abound on the older non-calcareous rocks; and certain portions of West Galway are a mere network of land and water.

MOUNTAINS.

The mountains of the west of Ireland are disposed in several well-marked groups. The lofty Galtees come into the district only by courtesy, since they project into the extreme SE. corner of Co. Limerick. Slieve Bernagh (1746 feet), and the adjoining Arra mountains, protruding masses of Old Red Sandstone and Silurian rocks, form the gates through which the Shannon bursts from L. Derg towards the sea.

A close-ranked and beautiful mountain-system, intersected by deep valleys, is grouped round the Killery fiord in Galway and Mayo. It includes Maam Turk, the Twelve Bens (misspelled Pins), the Partry Mountains, and the Mweelrea group, with Croaghpatrick as a northern outlier. The highest point is Mweelrea (2688 feet); and many summits exceed 2000 feet. These hills are formed of igneous, metamorphic, or Silurian rocks. An adjoining but less compact group lies to the northward, north of Clew Bay, extending from Nephin (2646 feet), which rises from the shores of L. Conn, on the east, over the Nephinbeg range, to Croaghaun in Achill, which drops sheer into the Atlantic in a 2200-foot precipice (plate 14). East of these, across the broad limestone trough of the Moy, the Ox Mountains (1685 feet) mark a very conspicuous fold which protrudes the ancient metamorphic floor through the sediments. And then, in the NE. part of the district, the country is broken up by a number of hill-groups of various ages. The best marked are the famous Ben Bulben range in Sligo and Leitrim, an elevated cliff-walled plateau of limestone; the Arigna and Slievanieran groups (1922 feet), dark hills formed of Coal-measures and Yoredale rocks, which continue NE. into the Cuilcagh group (2188 feet), and northward, with several intersecting valleys, as far as the heathery sandstone hills that lie behind the great limestone cliff-wall which overhangs Lower L. Erne.

All these groups, taken together, are disposed in a semicircular fashion around the central inland part of the district, where, over East Mayo, Roscommon, NE. Galway, and the greater part of SE. Galway, the low Limestone Plain extends almost unbroken, averaging only about 200 feet in elevation, and watered by the Shannon and its tributaries.

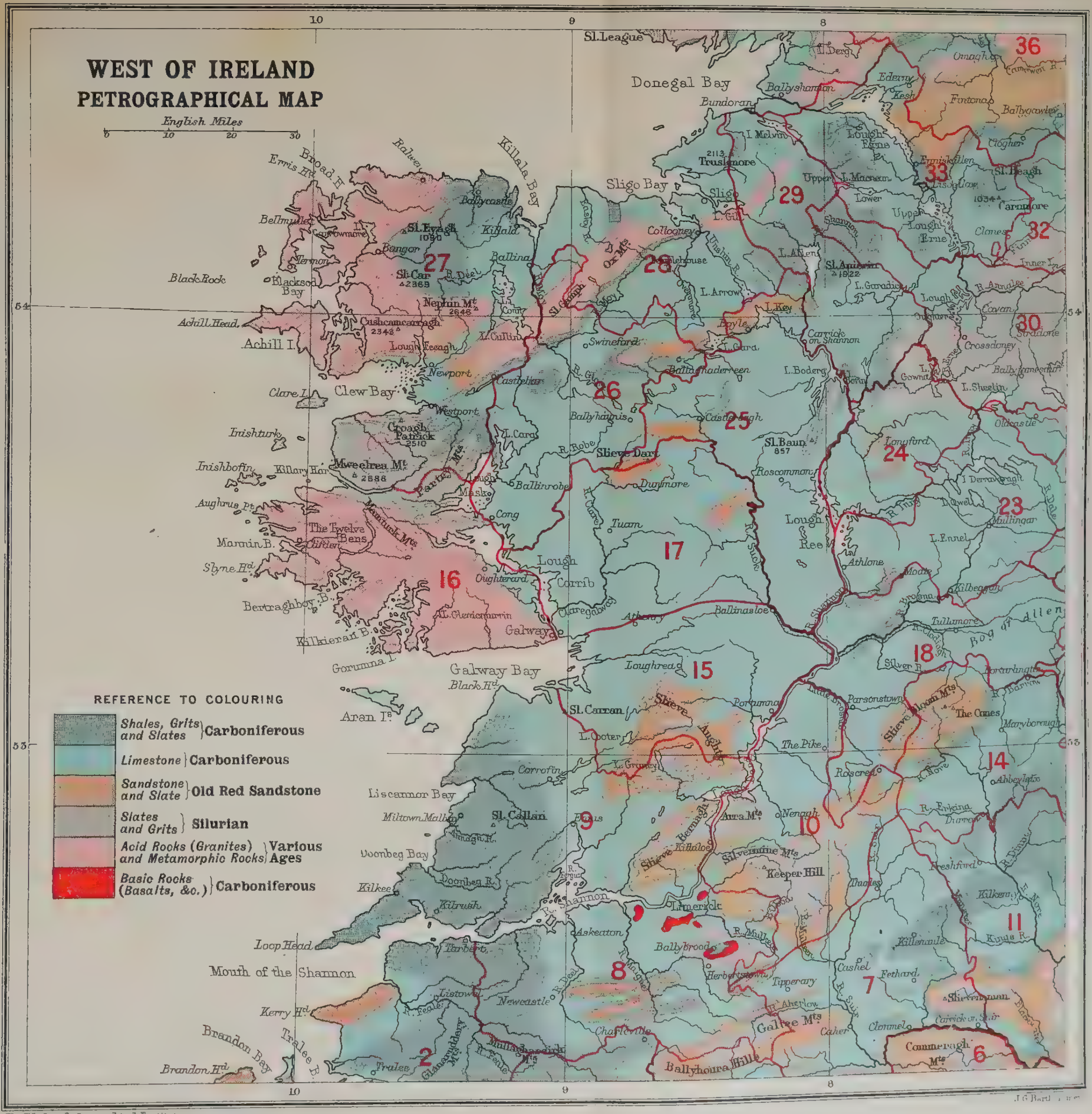
ROCKS AND SOILS.

The main features of the petrography of the district have been already indicated in the preceding paragraph. The Carboniferous limestone occupies fully half of the total area. Generally it is low-lying, drift-covered in the eastern tracts, often bare over large areas in the west. In north Clare it rises in terraced hills to over 1100 feet, and again in Sligo and Leitrim, where the cliff-walled mountains rise to 2100 feet.

In west Clare and west Limerick in the south, and again around the source of the Shannon in the north, the limestone is buried under shales and sandstones of Upper Carboniferous age, which form, in the last-mentioned district, hills up to 2000 feet and more in height.

In West Mayo, over a considerable area, the limestone has been stripped off, and the ground is occupied by the Lower Carboniferous Sandstone. Again, here and there over the Limestone Plain, foldings bring up the underlying Devonian and Silurian rocks, and form ranges of heathery hills rising from the grassy plain, as in Slieve Bernagh, Slieve Aughty, and minor ridges.

But the most marked contrast to the prevailing limestone, and the feature that gives to the west of Ireland its most striking character and scenery, is the great buttress of ancient granites, gneisses, mica schists, quartzites, and Silurian slates that forms West Galway and West Mayo. This is a mountainous district of bog and rock, with many lakes, and a fretted coast-line, full of scenery of a very high order of beauty. On three sides this area is washed by the Atlantic waves; on the fourth, the eastern side, the hills sink abruptly into the Limestone Plain, a chain of large lakes marking the change of rock.



WEST OF IRELAND
PETROGRAPHICAL MAP

The Edinburgh Geographical Institute

No rock newer than the Carboniferous takes part in the general building up of the district. The limestone plain is largely covered over with glacial drift (generally a stiff limestone Boulder-clay), especially in its eastern portions. Here extensive grass-lands prevail, with a fair amount of cultivation. The drift in turn is often buried under peat bogs, which are numerous and extensive; and esker ridges, formed of gravel and sand, raise their sinuous green slopes here and there. As already mentioned, many of the western parts of the limestone area are quite devoid of both drift and peat, and the water-worn rock lies bare. The Carboniferous shales weather down into heavy clay land, uninteresting to the botanist. The sandstones, whether of Carboniferous or Devonian age, are usually covered with a shaggy coat of heather, growing on dryish peat or sand. The Silurians produce a more loamy soil, which often supports a grassy vegetation at all elevations. The metamorphic rocks of West Galway and West Mayo have usually a covering of wet peat, with many small swamps and lakes.

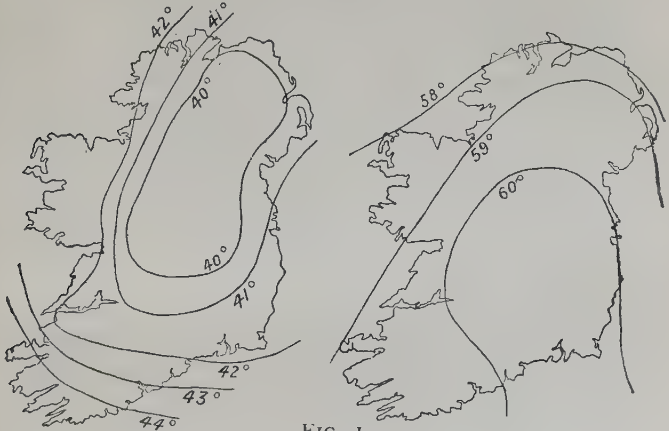


FIG. I.

January isotherms. July isotherms.

CLIMATE.

The climate of Ireland, as a whole, is distinguished by its equable character. It is, in comparison with neighbouring countries, cool in summer, warm in winter, and damp all the time. The January isotherm of 42° F. (5.56° C.), which passes through the whole length of our district from north to south, fringes the Welsh coast, cuts across Devon, runs along the west and south coasts of France, and thence through north Italy and Greece. The July isotherm of 59° F. (15° C.) runs likewise along the axis of our district; then along the Cheviots, up the backbone of Scandinavia, and across the head of the White Sea into Siberia. The annual range of temperature is 14° to 16° F. (7.78° to 8.89° C.) as compared with 22° to 24° F. (12.22° to 13.33° C.) prevailing in England. Frost is rare in the west, and almost unknown on some of the islands. The rainfall over the district is generally from 40 to 60 inches, but at wet spots among the mountains it far exceeds this. Thus, the average for sixteen years at Kylemore, in Connemara, is given as 81.79 inches. But the total rainfall conveys no indication of the number of damp, cloudy, drizzly, and showery days that prevail in western Ireland; which have a much greater effect on plant life than deluges of rain lasting through a comparatively short period.[1] The prevailing winds are westerly; and the winter on the west coast might be described as a succession of westerly gales with westerly winds between. The influence of these conditions on the vegetation is clearly seen.[2] In exposed ground, as in southern Clare, not a native tree is to be found for miles inland; and everywhere in the district (as indeed more or less over the whole of Ireland) the bending of trees towards the east is noticeable (fig. 8, p. 78). On the other hand, the

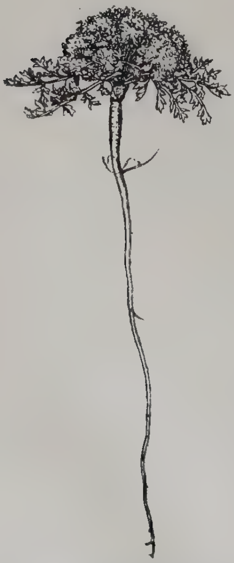


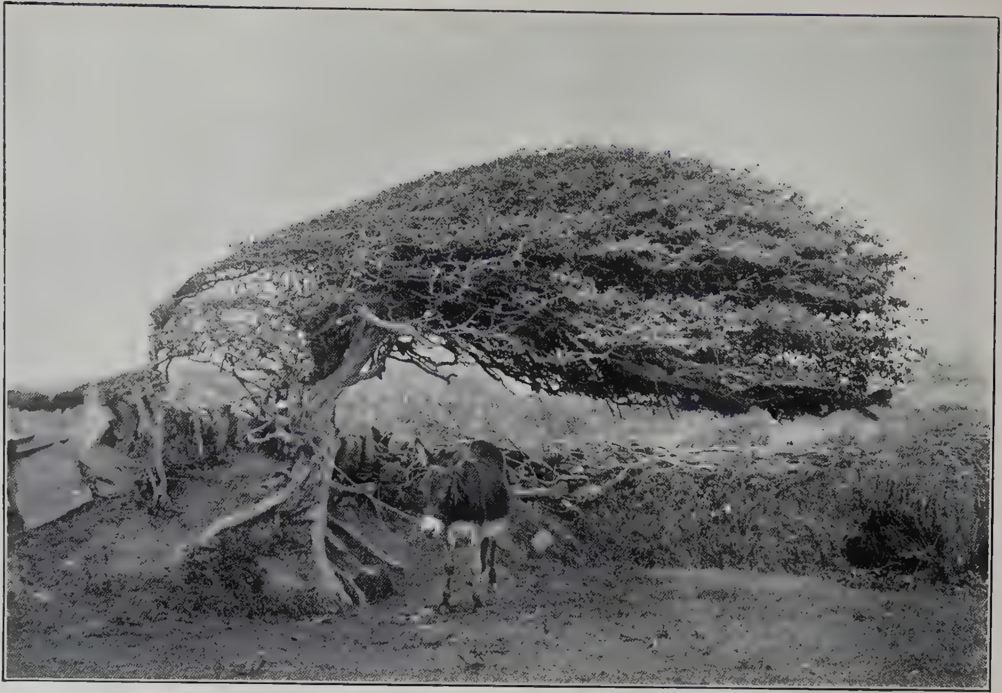
Fig. 2.—*Daucus Carota*, from Inishkea, Co. Mayo, showing effect of exposure. ½.

---

[1] The constancy of moist atmosphere on the west coast may be judged from the fact that, on the north side of Slieve More, Achill, *Hymenophyllum unilaterale* forms an abundant ingredient of the sward covering the slope, growing fully exposed and open to the sky, among Sphagnum and stunted heather; while *Nymphæa alba* grows hard by in a marsh as a terrestrial plant, with short-stalked aerial leaves.

[2] On Achill Island, *Eryngium maritimum*, with spreading roots 3 to 4 feet long, produces annual shoots from 3 to 4 inches high. On Inishkea, *Daucus Carota* grows quite stemless, with a sessile umbel nestling among a rosette of leaves. See also the description of Plantago sward (p. 18) for an example of dwarfing by exposure.

PLATE 2.



EFFECT OF WESTERLY WINDS ON TREES.

Cratægus Oxyacantha on flat country several miles from the sea near Doonbeg, Co. Clare.

G. Fogerty, Photo.

To face p. 6.

bitter easterly winds of spring are hardly felt on the west coast, and exercise no influence on the vegetation.

An important effect of the exposure is a reduction of the elevation up to which agricultural operations can be carried on. While in sheltered inland districts tillage may range as high as 1000 feet, in West Mayo and West Galway its limit does not exceed 400 feet, and is usually only about 200 feet. While the exposure has a dwarfing effect on vegetation, and on trees in particular, the mild, moist climate, and the rich, warm soil that prevails on the limestone, produce a remarkable luxuriance of vegetation where shelter from wind is afforded. Thus, in Burren, *Asplenium marinum* may be seen with fronds 3 feet in length; *Ceterach officinarum*, exuberantly crenated, attains a length of 1 foot; *Adiantum Capillus-Veneris*, nearly 2 feet. Mr. Colgan records *Polypodium vulgare* 1 foot 11 inches long from L. Derg. On Aran, *Allium Babingtonii* attains a height of 6 feet. On the islands in L. Erne, *Solidago Virgaurea* grows 4 feet in height, *Campanula rotundifolia* 3 feet, and *Polygala vulgaris* forms clumps with a hundred upright stems a foot high.

VEGETATIONAL SUBDIVISIONS.

The area divides itself into several distinct vegetational regions, dependent on broad geological features. In the widest sense, the district might be divided into a grass-land area, coinciding with the distribution of Carboniferous limestone, and a heath-land area, occupying the tracts dominated by igneous and metamorphic rocks, and sandstones. Slates and shales yield a type of vegetation not so marked as that of the rocks before mentioned—the former grassy or heathy in this district; the latter often of a rushy-grassy character.

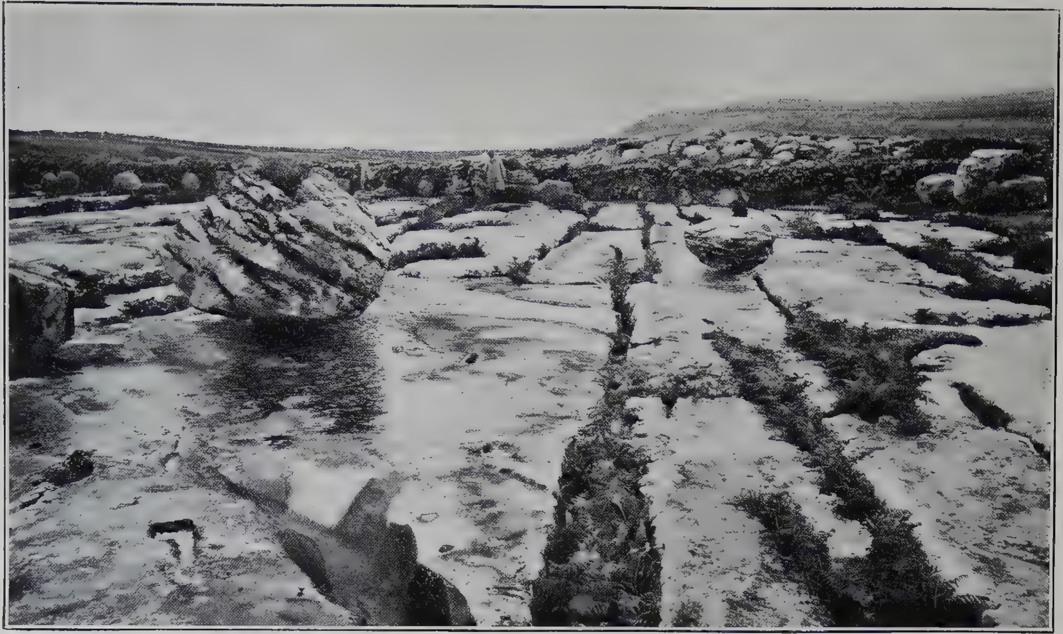
The Limestone Plain.

Drift Area.—The vegetation of the limestone region again divides itself into two sections, according as drift is present or absent. The Central Plain of Ireland consists of an almost unbroken stretch of Carboniferous limestone, raised from 100 to 300 feet above the sea. It is usually heavily covered with Boulder-clay, and to a very large extent occupied by grazing land, except where the drift is in its turn covered by peat-bog. Within our area, this type of surface and of vegetation prevails over parts of Limerick and Clare, the greater portion of SE. Galway, practically the whole of NE. Galway, Roscommon, and E. Mayo, and parts of Sligo, Leitrim, and Fermanagh. In these districts grass-land occupies nearly two-thirds of the entire surface, and peat-bog about one-eighth.

DRIFTLESS AREA.—The drift gets thinner as one goes westward, and along much of the western edge of the limestone it is entirely absent. The bare grey water-worn rock, deeply fissured, lies open to the sky, harbouring a flora remarkable in character, and differing widely from that of the limestone drift. This type of ground and of vegetation is found *par excellence* in the Barony of Burren in NW. Clare, where it is dominant over hill-ranges of 1000 feet and more in height, and down to sea-level (plates 3, 4, 8, 18). Elsewhere it is entirely a lowland type, extending southward through central Clare into the Askeaton district of Limerick, and northward round the head of Galway Bay and along the edge of the chain of lakes that cuts off the Limestone Plain from the metamorphic highlands, as far north as Lough Carra. This region of "crags," "clints," or "pavements," is quite one of the most interesting which the botanist finds in Ireland.

GALWAY-MAYO HIGHLANDS.

A profound and almost dramatic change of scenery and of vegetation is obtained by venturing only a mile westward from the edge of the northern portion of the Limestone Plain with its fringe of bare "crags," into the metamorphic region which immediately adjoins. The western portion of the counties of Galway and Mayo, which stands out into the Atlantic, consists of a wild confusion of heathery mountains, vast bogs, and peaty lakes; and in the absence of drift, the transition from limestone, grass, and a calcicole flora to gneiss, heather, and a calcifuge group is abrupt. Here in Connemara, Erris, and the adjoining tracts, despite the result of centuries of farming and reclamation, grass-land of all kinds occupies only about one-third of the total area of over 2000 square miles, while bog and mountain land, generally dominated by an ericaceous vegetation, claim nearly one-half. The continuity of the bogland region is scarcely interrupted by the deep indentation of Clew Bay, the westward prolongation of a tongue of low limestone country that protrudes from the eastward; and the mass of Silurian rocks that adjoins Clew Bay on the southward presents the same bold features and much the same type of vegetation offered by the granites, gneisses, and quartzites that characterize the remainder of the area. The same remark applies to the



Denudation of Limestone by Solution in Co. Clare.

The boulders in the middle distance represent the wreck of an upper bed, which is seen in the background. The solid floor formed by the next bed is now being attacked—note the enlarged joints, and the water-channel in the foreground.

R Welch, Photo.

To face p. 8.

Carboniferous sandstone which prevails over much of the Barony of Tirawley in N. Mayo.

Several of the heaths which flourish here are unknown elsewhere in the British Isles; some other characteristic species are of the greatest rarity; the district, indeed, runs its antithesis, the limestone pavement tract, very close, as being one of the most remarkable and interesting botanical areas in the British Islands.

The great anticline of the Ox Mountains, formed also of metamorphic rocks, which runs from Mayo, NE. into Leitrim, possesses little of the special interest which attaches to the Galway-Mayo highlands.

BEN BULBEN PLATEAU.

Next in interest of the floral regions within our boundaries is the limestone plateau of Ben Bulben, near the northern end of the district. Here, the Carboniferous limestone, which is generally low-lying in Ireland, is raised up 1000 to 2000 feet. The course of denudation has been determined by the vertical jointing of the rock, while its tabular surfaces have better resisted the action of the weather. There now remains a cliff-walled plateau, still bearing a few patches of the overlying Yoredale sandstones, and capped over the greater part of its surface, curiously enough, by a heavy covering of peat and heather. The plateau is intersected by two valleys cut down through a thousand feet of limestone into the shales below (see plate 15); and several imposing isolated hills, now separated from the main mass by miles of fertile plain, attest its former extension. In this region, but few of the characteristic members of the "pavement" flora lately alluded to are found; and the vegetation derives its character from the profusion of alpine species which cling to the great cliff-walls and talus slopes.

The crag country, the Connaught metamorphic district, and the Ben Bulben plateau are the three most interesting regions within our area.

LIMESTONE LAKE-SHORES.

A fourth characteristic type, allied to that of the crags, is supplied by the shores of the large lakes (notably those of the Shannon) that lie within the Limestone Plain. These shores are usually very irregular and rocky (plate 9), with numerous outlying reefs and islands, and they harbour many of the rarer crag species and some plants besides which are not found except on the lake-shores.

COAL-MEASURE AREAS.

Of other types of ground which help to make up our district, that which occupies the largest surface is the Coal-measure area which extends over Clare west of the River Fergus, and the corresponding western portion of Limerick. The shales which predominate here weather down into deep, wet clay-land, with a grassy vegetation full of rushes, horsetails, and marsh orchids. The higher grounds are often covered with peat. In this country, soft, rounded outlines prevail, and bold features are absent, unless the deep glens cut by streams in the soft material may be allowed to rank as such. The flora is calcifuge, with a high percentage of marsh-loving species, and is, in general, rather monotonous and devoid of rare or interesting plants.

SANDSTONE HILLS.

In Leitrim and Roscommon, about Lough Allen, another tract of Coal-measures is situated, but soon gives way on the northward to the underlying Millstone Grit and Yoredale series, which stretches north to Lough Erne. This is a district of heathery hills with bold sandstone scarps, which in the northern portion are tenanted by a "Scottish" plant-group of high interest.

In various places in our western area, but mainly in the south, the Old Red Sandstone breaks through the covering of limestone, and forms more or less conspicuous heathery ridges. These again yield a calcifuge flora, but though some of them attain a height of over 1700 feet, few mountain or northern species occur.

It will be seen, then, that the leading geological features, and their correlated types of vegetation, may be roughly grouped as follows :—

Limestone area.	1. Limestone drift area, .	Chiefly SE. and NE. Galway, Roscommon, E. Mayo.
	2. Limestone crag area, .	N. Limerick, Central and N. Clare, western edge of SE. and NE. Galway and SE. Mayo.
	3. Limestone lake-shores, .	Loughs Derg, Ree, Corrib, Mask, Carra, Conn.
	4. Limestone mountain-cliffs,	Ben Bulben range and adjoining hills.

Non-Limestone area.	5. Metamorphic and igneous area,	W. Galway and W. Mayo, W. Sligo.
	6. Shale area (Coal-measures),	W. Clare, W. Limerick.
	7. Sandstone scarps (Carboniferous),	Central Leitrim, W. Fermanagh.
	8. Old Red Sandstone ridges,	E. Clare, South SE. Galway, &c.

Factors other than Edaphic.

In the preceding paragraphs an attempt has been made to correlate the leading natural botanical regions included in our district, with the petrographical conditions on which these mainly depend. Factors other than edaphic enter only to a small degree into the question of the distribution of the flora. The range in latitude, for instance, is not sufficient to exercise any profound influence. Indeed, the isotherms at certain times of year, in this area, run north and south along the coast (fig. 1), the temperature increasing westward instead of southward, which may be partly accountable for the marginal distribution of some of the rarer plants. Range in altitude has, of course, its usual influence, though in this region we are met with many topsy-turvydoms in the way of the presence of alpine plants at sea-level, and the absence, from even the highest mountains, of other alpines of wide range in the British Islands.

In a subsequent section, we shall consider the flora of the various portions of the area more in detail. To do this, it will be convenient to abandon the boundaries of the main botanical regions, and accept instead the familiar political districts—the counties—modified in this case by the subdivision of the larger counties that has been made for the purposes of botanical census, fully described in "Irish Topographical Botany."

PLANT-FORMATIONS AND NATURAL GROUPS.

The study of vegetation in the west of Ireland has not yet advanced sufficiently to allow of any concise account of the composition and distribution of the formations and associations which compose it; but it may be useful to bring together whatever notes are available.

The leading feature of the vegetation of the district as a whole is its conspicuous division into a calcicole and a calcifuge section—a contrast rendered the more striking by the fact that these two characteristic floras attain their greatest development in two adjoining areas, one on either side of Galway Bay—the calcicole flora in Burren on the Clare shore, the calcifuge in Connemara on the Galway side. The features and composition of these two remarkable floras are described in subsequent pages.

At the same time it is necessary to remark that the presence or absence of limestone rock does not of necessity bring in its train the corresponding flora. The presence of a large group of calcicole plants on the metamorphic rocks of SW. Connemara, referred to elsewhere (p. 68), is sufficiently accounted for by the highly calcareous nature of the sea-sands in the vicinity; but the explanation of the presence of *Erica cinerea* on bare limestone tracts here and there is not so obvious, and, like the other cases quoted below, calls for a series of close observations and chemical experiments not yet carried out. A few other exceptional occurrences of calcifuge plants on limestone, or *vice versa*, may be quoted:—

At the eastern base of Keshcorran in Sligo, on drumlins formed of limestone drift lying on the Limestone Plain, *Cytisus scoparius*, *Digitalis purpurea*, *Blechnum Spicant*, *Athyrium Filix-fœmina*, and other characteristic calcifuge species flourish[1]; here probably, the lime has been washed out of the soil in which the plants grow.

On scarps of Yoredale sandstone in the Carrick district of Co. Fermanagh, *Sesleria cærulea*, *Arabis hirsuta*, *Asplenium Ruta-muraria*, all conspicuous calcicoles, grow mixed with such calcifuge species as *Vaccinium Vitis-Idæa*, *V. Myrtillus*, Calluna, Erica, Digitalis, and Blechnum.[2]

The strongly calcicole *Euphrasia Salisburgensis* furnishes other examples.

CENTRAL PLAIN GRASS-LANDS.

The grass-lands, offering little to the botanist, which are so characteristic of the limestone drift, and which extend especially over the eastern portions of Galway and Mayo, and over Roscommon, present every gradation from xerophile, where esker-ridges or light well-drained soils prevail, to hydrophile, the marshy type being the commoner of the two extremes. The xerophile type exhibits a close grassy sward, with much *Briza media*, *Kœleria cristata*, *Trisetum flavescens*, and

---

[1] *Irish Nat.* xii., 273. 1903.

[2] *Irish Nat.* xiii., 241. 1904.

Avena pubescens, often a great quantity of *Antennaria dioica*, and a sprinkling of such plants as *Chlora perfoliata*, *Poterium Sanguisorba*, *Carlina vulgaris*, *Ophrys apifera*. The mesophile type is tenanted by a greater number of different grasses, with *Orchis Morio*, *O. pyramidalis*, *Gentiana Amarella*, *Erythræa Centaureum*, &c., as concomitants. When the ground gets damper, *Parnassia palustris*, *Cnicus pratensis*, *Orchis maculata*, *Habenaria conopsea*, *H. bifolia*, *H. chloroleuca*, *Selaginella selaginoides* become abundant; and when the meadow degenerates into marsh, limy or boggy, a taller, coarser vegetation comes in—much *Schœnus nigricans*, *Juncus glaucus*, *J. obtusiflorus*, *Carex filiformis*, *C. paludosa*, with colonies of *Thalictrum flavum*, *Lysimachia vulgaris*, *Epipactis palustris*, and sometimes the rare *Lathyrus palustris*. The edges of pools, which gleam white in summer with limy incrustation, are tenanted by tall groves of *Cladium Mariscus* and *Phragmites communis*, while in the water *Ranunculus circinatus*, *Potamogeton plantagineus*, *Chara polyacantha*, are characteristic species, often heavily incrusted with lime.

CENTRAL PLAIN BOGS.

The great red bogs that are so characteristic of the Limestone Plain are usually rather higher than the surrounding country, rising from 15 to 25 feet above it, and lie like inverted saucers on the level surface. Their edges have almost invariably been nibbled into by man, and a floor of peat is often left, used for drying and stacking turf, on which the bog flora has been destroyed. *Rumex Acetosella*, *Holcus mollis*, *Agrostis vulgaris* colonize this ground; and on rougher parts *Digitalis purpurea* and other characteristic calcifuge species, *Betula verrucosa*, *Lastrea spinulosa*, *Osmunda regalis*, are often abundant. Turf-cutting has drained to a greater or less extent the fringe of the bogs, and encouraged the growth of Ling, while injuriously affecting most of the bog species. Beyond this influence, we get the characteristic bog flora; *Calluna vulgaris*, though stunted, is usually dominant; *Erica Tetralix*, *Scirpus cæspitosus*, *Narthecium ossifragum*, *Eriophorum vaginatum*, *E. angustifolium* are abundant, with much Sphagnum among which ramble the straggling stems of *Andromeda Polifolia* and *Vaccinium Oxycoccus*; and often bosses of *Rhacomitrium uliginosum*. The shallow sinuous pools and depressions are full of Sphagnum, *Rhynchospora alba*, *R. fusca*, the three species of Drosera, *Menyanthes trifoliata*, *Utricularia minor*, *Carex limosa*.[1]

---

[1] See also "Irish Top. Bot.," pp. xxx–xxxii.

West Coast Bogs.

The bogs in the western portions of the district, as in Connemara, while they are immensely developed as to area, are seldom of such depth as the red bogs of the Central Plain; are of slower growth, and formed consequently of blacker, more decayed peat; and are more often on sloping ground, or broken up by rocky ridges and knolls. While the flora in general remains much the same, there are a few striking changes in its constitution. Two of the most characteristic plants of the Central Plain bogs, *Andromeda Polifolia* and *Vaccinium Oxycoccus*, are usually absent; while, on the other hand, *Drosera intermedia* and *Carex limosa* are more abundant, with *Utricularia intermedia* and *Hypericum elodes*.

The following analysis of the flora of a bog of intermediate type, situated in western Clare, will serve as an example:—

Monmor Bog, Co. Clare.

Extensive bog, swelling in centre to about 15 feet above margins. Smooth surface, with low vegetation of grassy appearance.

Calluna vulgaris, c.
Narthecium ossifragum, c.
Rhynchospora alba, c.
Eriophorum vaginatum, c.
Cladonia rangiferina, c.
Campylopus fragilis, c.
Erica Tetralix, f.
Drosera, 3 species.
Menyanthes trifoliata.
Orchis maculata.
Scirpus cæspitosus.
Sphagnum spp.

No pools, and hence absence of *Rhynchospora fusca*, &c. Great uniformity of vegetation. Occasional patches of *Myrica Gale* and *Molinia cœrulea*.

The range and relative quantity of the various types of moor on the metamorphic area have not been determined yet. The formation prevailing over the great bogs of south Connemara is Molinia moor, stretching for miles. *Molinia cœrulea* is here dominant, usually in the small form *depauperata*; *Calluna vulgaris* and *Erica Tetralix* occur throughout, but are quite subordinate, as are *Rhynchospora alba*, *Scirpus cæspitosus*, *Schœnus nigricans*, *Narthecium ossifragum*, Cotton-grasses, and Sundews. There are wetter areas, which probably represent rock-basins not yet quite so filled up. Here *Rhynchospora alba* is dominant, with much Schænus and Sphagnum, some *Rhynchospora fusca*, *Menyanthes trifoliata*, and the other species mentioned above; Heaths occurring only as odd, starved plants. Patches of Phragmites and Cladium growing here and there suggest the last survivals of the flora of lakelets now overwhelmed by the bog. The Molinia moor extends down to sea-level, and up to about 1000 feet on the hills, where, with better drainage, it is replaced by the familiar Calluna formation, with patches of *Scirpus cæspitosus* moor on high-level flats. The impression conveyed by the vast mantle of bog in Connemara is that peat-formation is still proceeding steadily over the great driftless rock-floor. While innumerable lakelets fill the hollows yet, every gradation may be traced from deep water, through Cladium and Phragmites swamp, and Rhynchospora bog, to the prevailing Molinia moor.[1]

A curious type of bog occurs especially on Achill Island, the whole surface being broken up into little stools of peat, 1 to 2 feet high, and a foot or so apart, crowned with Calluna, Molinia, &c., between which stretches a floor of bare peat, thinly colonized by *Eriophorum angustifolium*.

Various other types of bog and moor vegetation are met with in our district, but neither their composition nor their distribution has been worked out. From Achill, for instance, the now familiar types of Calluna moor, Eriophorum moor, and Scirpus moor are recorded, as well as a type where Narthecium is dominant; and in the same area, on the Meenawn range, an interesting sub-alpine moorland association is extensively developed, consisting of a dense close mat of *Calluna vulgaris*, *Arctostaphylos Uva-ursi*, *Empetrum nigrum*, and *Juniperus nana*, with *Salix herbacea*, *S. repens*, grasses, and sedges.[2]

WOODS AND COPSES.

There is now very little natural wood in the west of Ireland. What there is is usually in the form of remnants of larger areas still remaining by reason of cultivation being precluded by the steepness or roughness of the ground on which they grow, or of their inaccessibility, as on islands in lakes. The destruction of former natural woods in many places is undoubted; but over large exposed areas near the Atlantic, there probably was at no time any arboreal vegetation. In the level inland districts a good deal of native timber may have existed; and woods on certain estates are stated by the owners to be aboriginal, though now more or less diluted with introduced species; but the only unquestionably native woods occur on the sides of glens and steep hills, on rocky ground, and on islands. The pristine woodlands have been destroyed by man; and grazing animals prevent their natural recrudescence. In glens and on hill-sides the timber is usually mixed and not tall. Ash and Oak (which alone attain the stature of forest trees), Aspen, Elm, Alder, Birch, Elder, Mountain Ash, Crab, Holly, Hawthorn, Hazel, and Wild Cherry occur in varying abundance. **Correl Glen** in Fermanagh furnishes a fine example of a native Birch wood. In glens and on cliffs on the limestone, *Pyrus Aria* and *Taxus baccata* are characteristic. On the limestone "crags" dense Hazel scrub is often developed in quantity; and we meet with a good deal of Buckthorn of both species, Dogwood and Spindle-tree, and locally both species of Juniper. The Hazel scrub of the crag-lands is well developed along the eastern base of the Burren hills. A fine Hazel wood below the **Slieve Carran** cliffs presents a canopy 15–20 feet in height, sufficiently dense to preclude the presence of all but shade plants. *Oxalis Acetosella* is the leading species, with *Circæa lutetiana*, *Viola sylvatica*, *Nepeta Glechoma*, *Sanicula europæa*, ferns, and very luxuriant mosses on the stones and tree-trunks. On the cliff-ledges above, an open Ash-Birch wood is developed, with a little Hawthorn, Mountain Ash, Holly, Wych Elm, Spindle-tree, Guelder-rose, and Dog Rose, over a sward of Dryas and grasses.

---

[1] See also The British Vegetation Committee's Excursion to the West of Ireland [by A. G. Tansley and others]. *New Phytologist*, vii., 253–260. 1908.

[2] R. Ll. Praeger: The Flora of Achill Island. *Irish Nat.*, xiii. 272–3. 1904.

One of the best examples of crag-land wood is found at **Garryland**, near Gort. Though many trees have been introduced here, the wood, as such, appears to be aboriginal. *Quercus pedunculata* and *Fraxinus excelsior*, largely self-sown, are co-dominant in places; *Ulmus montana*, self-sown, locally dominant; *Prunus spinosa* (abundant), *Cratægus Oxyacantha* var. *monogyna*, *Pyrus Malus* var. *acerba*, *Ilex Aquifolium* (self-sown), *Euonymus europæus*, *Viburnum Opulus*, *Hedera Helix* (abundant), and Rubi. Beech and Conifers have been planted. Round the skirts of the wood are Yew and Hazel, with remarkably luxuriant *Juniperus nana*. "Although developed over limestone, the soil over considerable tracts gave no calcareous reaction, and the general character of the wood inclined to the oak-, rather than to the ash-type. It is, however, quite possible that it has been derived from a wood of the ash-type by continuous accumulation of soil and washing out of lime; and this view is supported by the abundance of ash in parts, and the occurrence of species like the Spindle-tree and the Helleborine [*E. atro-rubens*], as well as by analogy with various English woods."[1]

---

[1] [A. G. Tansley], in *New Phytologist*, vii., 260. 1908.

In **Lower Lough Erne** many of the islands, formed of drift-covered limestone, are thickly wooded; some have been planted more or less, but in others the timber is clearly aboriginal. In these cases it consists of Oak, Ash, Alder, Birch, Aspen, Hazel, Hawthorn, Holly, Spindle-tree, Purging Buckthorn, Mountain Ash, Crab, Guelder-rose, Blackthorn, with some Willows, Roses, and Brambles. The limestone islets in **Lough Carra** are crowded with *Betula pubescens*, *Rhamnus catharticus*, *Fraxinus excelsior*, *Salix aurita*, *S. cinerea*, *Juniperus communis*; less of Hawthorn, Holly, Spindle-tree, Mountain Ash, White Beam, Guelder-rose, Elm, Hazel, Aspen; and a little Wild Cherry, Elder, Alder, Great Sallow, Oak. In the **Connemara lakes**, amid a calcifuge flora, the island trees consist of much stunted Yew, with Mountain Ash, *Juniperus nana*, *Ulex Gallii*, Holly, and Bog Myrtle, the whole sloping up from water-level on the western side to about 20 feet on the eastern (see also p. 78 and fig. 8).

On the maritime islands arboreal vegetation is reduced to a bushy growth in sheltered spots, and mostly where inaccessible to grazing animals. On **Clare Island** the native species are Ash, Oak, Birch, Holly, Hazel, Mountain Ash, Blackthorn, Sallows (*S. aurita* and *S. cinerea*), and Common Gorse; no tree on the island, including some introduced species planted near houses, exceeds 12 feet in height. On **Inishturk** most of the few trees take the form of low, broad brushes, 3 to 4 feet high, and 6 to 8 feet across—partly, no doubt, the result of grazing. The species there represented are Birch, Aspen, Crab, Holly, Elder, Hazel, Blackthorn, Hawthorn, *Salix cinerea*, *S. repens*, *Rosa canina*, and Brambles. On the extensive area of the **Mullet**, which is even more wind-swept than the islands, a couple of small bushes of *S. aurita* and *S. cinerea*, a little Gorse, and some Brambles, are the only shrubs taller than *Salix repens*. The rarity of native wood in the west of Ireland results in a paucity of saprophytic and other forest plants. *Neottia Nidus-avis* and *Lathræa squamaria* occur, and rarely *Hypopithys multiflora*; *Orobanche Hederæ* is frequent on Ivy among tangled shrubs; many of the woodland plants are usually found under Bracken or on open slopes facing north.

MARITIME FORMATIONS.

As compared with that of the east coast of Ireland, or with the English shores, the flora of the sandy beaches and sand-dunes of the western coast is singularly poor. The character of the ground is also often different. While in some favoured spots, as on the Mullet, at Strandhill in Sligo, and Killala in West Mayo, we find well-developed dunes, backed by undulating moss-grown sandy ground; in other parts, the sands are reduced by exposure to mere deserts. The great tracts beyond Bunowen in SW. Connemara, at Keel strand in Achill, and on North Inishkea will serve as examples. These large level areas are quite bare of vegetation, or support a miserably poor and starved flora. But even where the sands are well colonized, the characteristic flora is much reduced. Among the dunes we miss the blue spires of *Echium vulgare*, and the grey leaves of *Cynoglossum officinale*; *Thalictrum dunense*, *Lychnis vespertina*, *Trifolium arvense* (to mention a few familiar east-coast sand-dune species) are likewise absent. *Lycopsis arvensis*, *Euphorbia portlandica*, and *E. Paralias* are quite rare; and on the beaches *Cakile maritima*, *Eryngium maritimum*, *Salsola Kali*, *Polygonum Raii* are but seldom found. The sand is often blown up adjoining hill-sides to a height of several hundred feet; elsewhere, as at Keel Lough in Achill, its advance has dammed the natural drainage and flooded a considerable extent of country.

The flora of the sea-rocks and cliffs is not much reduced as contrasted with the east coast, and compares favourably with it, yielding, in addition to all the common species, such plants as *Lavatera arborea*, *Statice occidentalis*, *Spergularia rupestris* in abundance, and other local species.

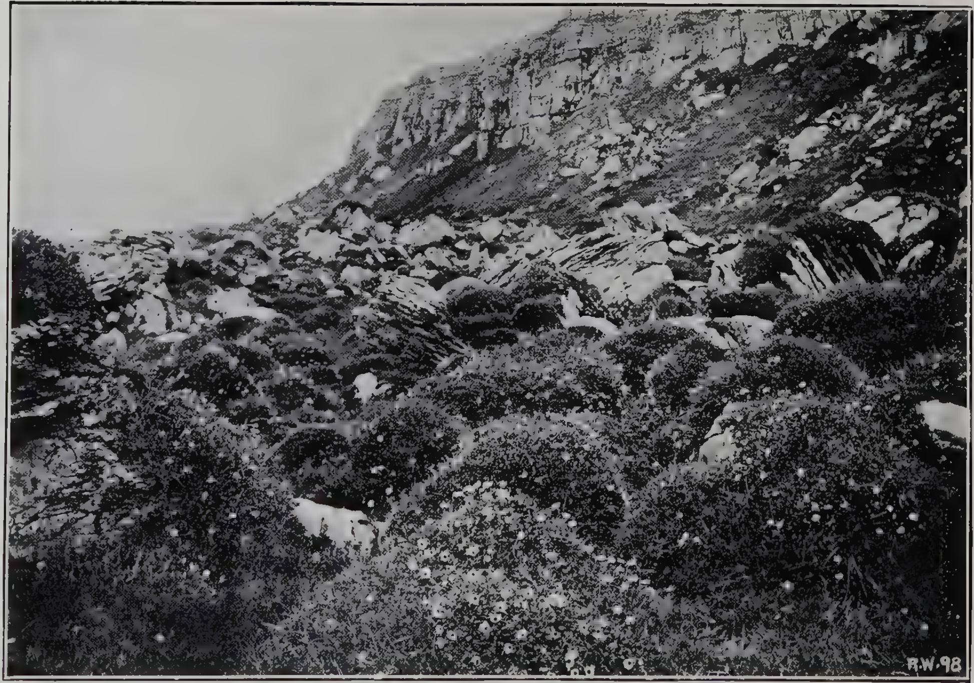
On the cliff-ranges *Sedum Rhodiola* joins the maritime group, and is often very abundant, with quantities of *Angelica sylvestris*, *Eupatorium cannabinum*, *Matricaria inodora*, *Beta maritima*, and other rank-growing species, on the damp ledges. The salt-marsh flora is likewise similar to that of the east coast, but rather poorer.

PLANTAGO SWARD.—One of the most distinct formations of the extreme west is a very close dwarf maritime sward, occupying wind-swept cliff-tops and slopes by the sea. It may be called Plantago sward, being composed mainly, often almost wholly, of *Plantago maritima* and *P. Coronopus*. As noted on Clare Island,[1] this association consists mainly of the two species named, with much *P. lanceolata*, *Thymus Serpyllum*, and *Euphrasia officinalis*, and in small quantity nearly thirty other species, all forming a dense sward about ½-inch in height, with flower-stems (even of the taller species like *Scabiosa Succisa* and *Hypochœris radicata*), rising about 2 inches. *Radiola linoides*

---

[1] R. LL. PRAEGER: The Flora of Clare Island. *Irish Nat.*, xii. 281. 1903.

Plate 4.



Dryas octopetala near Black Head, Co. Clare.
The plant is completely dominant, and with the aid of mosses has buried boulders three feet in height. May, 1907.

R. Welch, Photo.

To face p. 19.

grows ½-inch high, and usually unbranched; *Ophioglossum vulgatum* the same height, and barren. The flowers of the majority of the plants rise level with those of *Anagallis tenella* and Radiola. At the west end of Inishkea, Plantago sward, consisting almost entirely of the two species first named, growing extremely minute, covers a considerable area. It forms a shining green carpet, so close that no lawn-mower, however close-set, could cut a leaf off it, and as smooth to the hand as a newly-ironed table-cloth. Plantago-sward is characteristic of areas of particularly great exposure close to the sea. It is well developed on Achill Island, Inishkea, Clare Island, and Inishturk, and at Loop Head, and ranges from sea-level to about 400 feet.[1]

ALPINE VEGETATION.

In Ireland alpine plants (that is, plants of Watson's Highland type) are, on the whole, rather poorly represented, no doubt mainly owing to the milder climate and to the smaller number and less elevation of the mountains. Ireland possesses about three-fifths of the alpine species of Great Britain. The west of Ireland is richer than the east, and our district yields 35 out of 41 occurring in the country. These do not form a homogeneous group. They are found at all elevations; some of them have their head-quarters in the lowlands, others on the highlands; some are always absent from higher elevations. Alpine formations, that is, vegetation in which alpine plants abound, are found only in a few limited areas, chiefly on cliffs facing north—Muckanaght in the Twelve Bens (1300–1800 feet), the scarp of Croaghmore on Clare Island (1000–1300 feet), and some of the cliffs in the Ben Bulben range (about 1200–1900 feet) furnishing the best examples. Otherwise the plants of Highland type are scattered widely over the hills and over parts of the low grounds. Of three of the thirty-five (namely, *Hieracium crocatum*, "Ballynahinch," *H. gothicum*, "Connemara," and *Cryptogramme crispa*, "Cuilcagh"), the vertical range is not known. Of the others, thirteen descend to sea-level; four grow at elevations of under 500 feet; four at under 1000 feet; seven at under 1500; three at under 2000 feet; one alone, the rather doubtful *Deschampsia alpina*, is recorded from over 2000 feet only.

---

[1] Plantago sward, as described above, occurs in similar situations on the Færöes, where it has been studied by Ostenfeld. (Botany of the Færöes, Part iii.) It is there almost identical in composition, except that *Silene acaulis* is often a conspicuous ingredient of the association.

If we give to the three doubtful species a range such as the nature of the ground and their range elsewhere would lead us to expect, we may represent the vertical distribution of alpine plants in the west of Ireland graphically, as follows :—

Thalictrum alpinum,	1300—2100
Subularia aquatica,	50—1200
Draba incana,	0—1950
Arabis petræa,	1330—1500
Silene acaulis,	400—1600
Dryas octopetala,	0—1220
Saxifraga oppositifolia,	450—2400
nivalis,	1200—1950
stellaris,	1050—2450
aizoides,	0—1600
Sedum Rhodiola,	0—2600
Epilobium alsinefolium,	800—1200
Galium boreale,	0—200
Saussurea alpina,	1100—1700
Hieracium anglicum,	0—2150
iricum,	0—1350
crocatum,	? 100—? 500
gothicum,	? 100—? 500
Arctostaphylos Uva-ursi,	0—1800
Vaccinium Vitis-idæa,	300—2400
Polygonum viviparum,	500—1200
Oxyria digyna,	600—2400
Salix herbacea,	1200—2600
Juniperus nana,	0—1800
Carex rigida	1600—2600
aquatilis,	0—160
Deschampsia alpina,	2100—2500
Sesleria cærulea	0—1100
Poa alpina,	1500—1950
Cryptogramme crispa,	? 1750—? 2000
Aspidium Lonchitis,	1150—1600
Aplenium viride,	700—1900
Lycopodium alpinum,	1560—2500
Selaginella selaginoides,	0—2100
Isoetes lacustris	0—? 1000

Mean of lower limits, . . . 594 feet.
Mean of mean heights, . . 1150 feet.
Mean of upper limits, . . 1705 feet.

None of our mountains is high enough to reach the region of an alpine-plateau vegetation. Indeed, the summits, commonly covered with peat, are usually very poor in alpines compared with rocky scarps on the flanks of the hills, especially where the latter face northward. This fact will appear if we take a few of the highest hills and note their summit floras.

Mweelrea summit, 2680 feet.

Potentilla Tormentilla.
Saxifraga umbrosa.
Calluna vulgaris.
Vaccinium Myrtillus.
Thymus Serpyllum.
Rumex Acetosa.
  Acetosella.
Juncus squarrosus.
Luzula maxima.
  campestris.
Scirpus cæspitosus.
Eriophorum vaginatum.
Carex pilulifera.
  binervis.
Agrostis vulgaris.
Anthoxanthum odoratum.
Deschampsia cæspitosa.
Festuca ovina.
Nardus stricta.

This list, it will be noticed, does not contain one of the twelve alpine plants of Mweelrea, which are spread vertically from 2600 feet to sea-level, their mean upper limit being 2050 feet, mean lower limit 777 feet.

Nephin summit, 2640 feet.

Potentilla Tormentilla.
Saxifraga umbrosa.
Galium saxatile.
Calluna vulgaris.
Vaccinium Myrtillus.
  Vitis-Idæa.
Armeria maritima.
Empetrum nigrum.
Rumex Acetosa.
Luzula maxima.
Anthoxanthum odoratum.
Deschampsia cæspitosa.
Festuca ovina.
Lastrea dilatata.
Lycopodium Selago.

Followed within two hundred feet, where drainage and shelter are better, by *Carex rigida*, *Saxifraga stellaris*, *Salix herbacea*.

Truskmore summit, 2113 feet, and 100 feet downwards.

Potentilla Tormentilla.
Galium saxatile.
Solidago Virgaurea.
Vaccinium Myrtillus.
Calluna vulgaris.
Euphrasia officinalis.
Melampyrum pratense.
Empetrum nigrum.
Orchis maculata.
Juncus squarrosus.
Luzula maxima.
  erecta.
Scirpus cæspitosus.
Eriophorum angustifolium.
  vaginatum.
Carex glauca (?).
  binervis.
  rigida.
Anthoxanthum odoratum.
Deschampsia flexuosa.
Blechnum Spicant.
Lastrea dilatata.
Lycopodium Selago.

The numerous alpine plants of this range occur on cliffs mainly between 1900 and 1200 feet.

The nearest approach to an alpine sward occurs on Curraun Achill, at about 1200 feet, where *Arctostaphylos Uva-ursi*, *Empetrum nigrum*, and *Juniperus nana* form a dense carpet; and on the Meenawn range on Achill Island, where a very close sward formed mainly of *Calluna vulgaris* and the three species before mentioned, with a little *Salix herbacea*, occupies the ground at 1300–1500 feet. But indeed an almost equally alpine facies is supplied by the sheets of *Arctostaphylos Uva-ursi*, *Dryas octopetala*, *Gentiana verna*, *Sesleria cærulea*, that in Burren range from over 1000 feet to sea-level, though mixed with such southern types as *Habenaria intacta* and *Adiantum Capillus-Veneris* (see frontispiece).

CHARACTER OF THE FLORA.

The total number of species and subspecies of native or fully naturalized plants included in the flora of the west of Ireland as enumerated below is just 1000; to which must be added 84 non-naturalized aliens and numerous varieties and hybrids. This number is not a fixed one, but is dependent on the conception of the meaning of the word *species*; in the present instance, the estimate may be regarded as a rather conservative one. The reduction in number of the total flora as compared with that of any equally large area of England is very noticeable.

There is abundant evidence that Ireland became an island before Great Britain did; in other words, that the land bridge connecting it with Great Britain broke down while the latter was still connected with the Continent. The zoological evidence on this point, such as the complete absence from Ireland of such common west European and British animals as the Voles, the Mole, Weasel, and several reptiles and amphibians, is particularly striking. And so, while the flora of Great Britain may be looked on as a reduced west European one, so the flora of Ireland may be considered to be on the whole a reduced British one—combined, as will be seen later, with highly interesting remnants of an older flora, which had been spread along a former continental edge. And further, when we compare the flora of western and eastern Ireland, we find a falling off in the number of species in the wet and boggy western tracts as compared with the more sunny eastern counties. Thus, while the average flora of the divisions facing the Irish Sea is about 710 species, the corresponding western divisions yield only about 665 species each, and that on areas larger by one-fourth, and more varied in character.

Elaborate comparison of the character of the flora of the west with that of the eastern part of the island, or with England or Scotland, would serve no useful purpose here; for dissertations on this subject larger works must be consulted.[1] It may be generally stated that, taking Watson's British types of distribution, the "English" group is in Ireland irregularly distributed, showing a general south-eastern trend; "Germanic" plants are almost non-existent in Ireland, as might be expected; the "Scottish" plants are in this country northern and western; the "Highland" plants the same, but more western and less northern; while "Atlantic" species range all round the coast of Ireland, being rather more plentiful in the southern half. Taking the "English" type as representing broadly the southern element in the Britannic flora, and "Scottish" plants as representing the northern, we find that the limits of these groups in the British Islands may be represented by rather suggestive curves, as shown in the subjoined diagram:

---

[1] See "Cybele Hibernica," *Introduction*, pp. xl-lii; and R. Ll. Praeger: On Types of Distribution in the Irish Flora. *Proc. R.I. Acad.*, xxiv., B., 1–60. 1902.

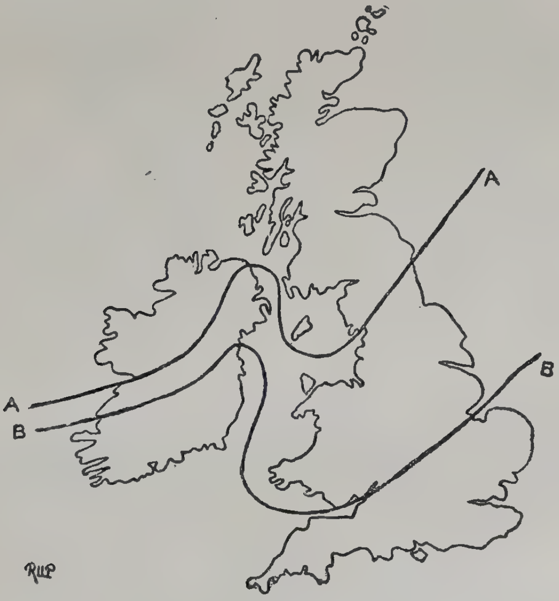


Fig. 3.—Isophytic lines in the Britannic flora.

AA. Northern limit of the "English" flora. BB. Southern limit of the "Scottish" flora. From Praeger, Types of Distribution, &c., *loc. cit.*

The plants which are essentially western in their range in Ireland may be listed as follows[1]:—

- Thalictrum alpinum.
  - collinum.
- Arabis ciliata.
- Draba incana.
- Helianthemum vineale.
  - guttatum.
- Viola stagnina.
- Arenaria ciliata.
- Geranium sanguineum.
- Astragalus Hypoglottis.
- Spiræa Filipendula.
- Potentilla fruticosa.
- Saxifraga nivalis.
  - umbrosa.
  - Sternbergii.
  - grænlandica.
- Drosera intermedia.
- Galium boreale.
  - sylvestre.
- Asperula cynanchica.
- Hieracium iricum.
- Erica Mackaii.
  - mediterranea.
- Dabeocia polifolia.
- Arctostaphylos Uva-ursi.
- Gentiana verna.
- Limosella aquatica.
- Euphrasia Salisburgensis.
- Bartsia viscosa.
- Ajuga pyramidalis.
- Polygonum viviparum.
- Oxyria digyna.
- Euphorbia hiberna.
  - amygdaloides.
- Juniperus communis.
  - nana.
- Taxus baccata.
- Epipactis atro-rubens.
- Habenaria intacta.
- Sisyrinchium angustifolium.
- Allium Schænoprasum.
- Juncus tenuis.
- Potamogeton Kirkii.
  - lanceolatus.
- Naias flexilis.
- Eriocaulon septangulare.
- Scirpus triqueter.
- Rhynchospora fusca.
- Carex Bœnninghauseniana.
  - trinervis.
- Deschampsia alpina.
  - discolor.
- Sesleria cærulea.
- Poa alpina.
- Trichomanes radicans.
- Adiantum Capillus-Veneris.
- Asplenium viride.
- Aspidium Lonchitis.
- Equisetum trachyodon.
- Lycopodium inundatum.
- Isoetes echinospora.

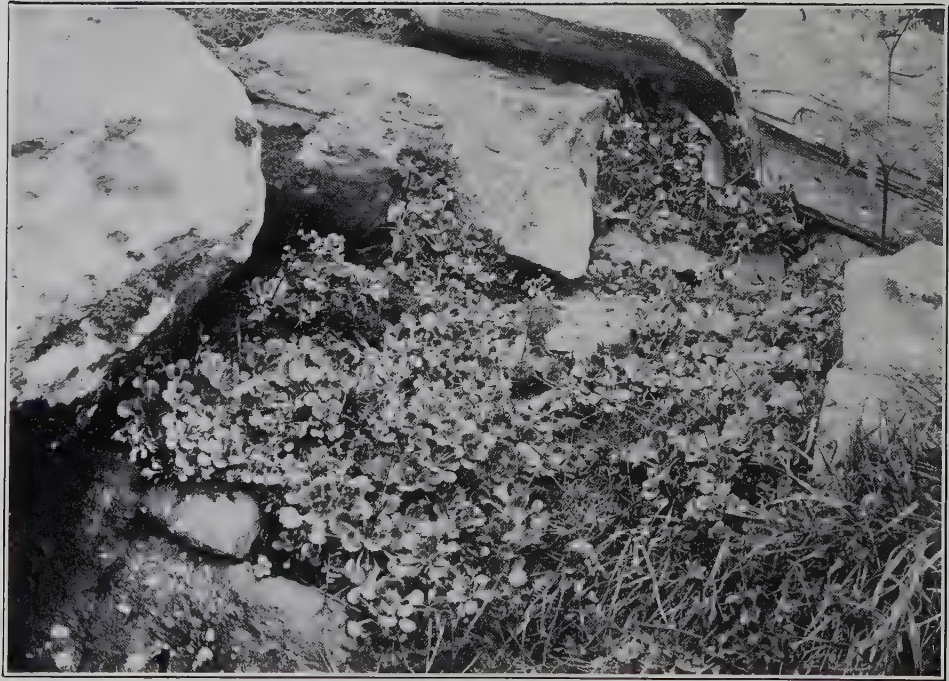
This list includes species, such as *Taxus baccata*, which is native in half the counties in Ireland, and from such down to others, like *Saxifraga nivalis*, which are confined to a single station. The statistical distribution of this group is shown by the diagram on opposite page, in which darker shading signifies increase in the number of species of the group occurring in each division.

Remarkable Features of the Flora.

The south and west of Ireland are famous among botanists, as among zoologists, for the occurrence there of a number of species either unknown or very rare in Great Britain, and in the

---

[1] Three of the species listed, namely—*Bartsia viscosa*, *Euphorbia amygdaloides*, and *Carex Bœnninghauseniana*, grow in the north-west and south-west, but have not been as yet found within our district.



SAXIFRAGA UMBROSA AT MALLARANNY, CO. MAYO.
June, 1907.

R. Welch, Photo.

To face p. 25.

adjoining parts of the Continent. The most interesting of these divide themselves into two groups—the one having a southern range, with a present head-quarters in the Pyrenees and the Peninsula; the other group being of American origin, and characteristic of northern latitudes there.

South-west European group.—The characteristic range of the plants of this group embraces Spain, Portugal, SW. France, SW. England, and W. Ireland. Two of the constituent species, *Saxifraga Geum* and *Sibthorpia europæa* (the first absent from Great Britain, the second present in S. and W.; both on the Continent confined to the SW.), are in Ireland found only in Kerry or Cork, and do not enter into the flora of the district under consideration. A third plant of the Kerry group, *Arbutus Unedo*, only differs from *S. Geum* in extending its Continental range all along the Mediterranean. *Pinguicula grandiflora* (plate 23) has its Irish head-quarters in Kerry and Cork, extends into one station in Clare, is absent from Great Britain, and has a European range embracing the Pyrenean region and the Alps. *Saxifraga umbrosa* has a wider Irish range (fig. 5), being locally abundant along the south and west coasts from Waterford to Donegal, save in limestone areas, and occurring at all elevations. Elsewhere it is confined to the Pyrenean region. *Euphorbia hiberna* (plate 24) ranges in Ireland as widely,

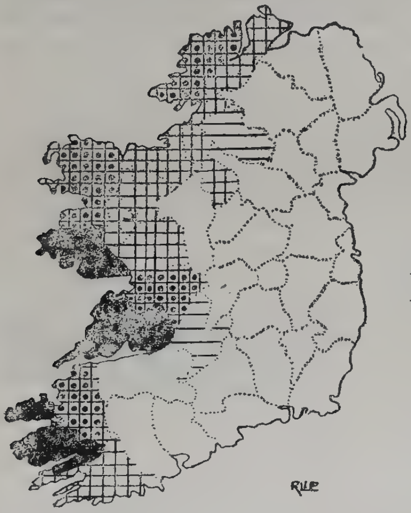


Fig. 4.—Distribution of "Connacian" Plants.

From Praeger: On Types of Distribution in the Irish Flora. *Proc. R.I. Acad.*, xxiv., B, p. 50. 1902.

but more sparingly, save in its obvious headquarters in the SW.; it reappears in SW. England (Cornwall, Devon, Somerset), and again on the Continent in the Peninsula. Next comes an extremely distinct and remarkable group of three Heaths—*Erica mediterranea* (plate 13), *E. Mackaii* (plate 20), and *Dabeocia polifolia* (plate 10), all confined in Ireland to the western parts of Galway and Mayo (fig. 15); as conspicuously absent from the SW. as the species mentioned earlier are present there; all absent from Great Britain, and on the Continent confined to SW. France or the Spanish Peninsula, except that the last-named extends to the Azores. It may be added here that two other Heaths, *E. ciliaris* and *E. vagans*, with the same Continental range, reappear in SW. England, but do not extend to Ireland; they belong to the same geographical group.

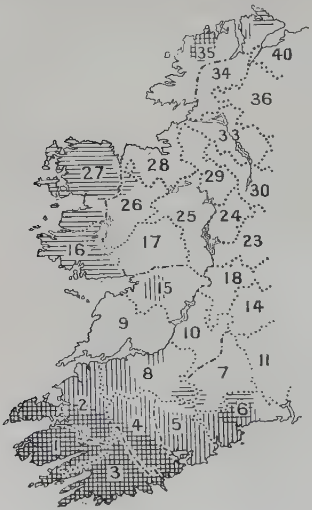
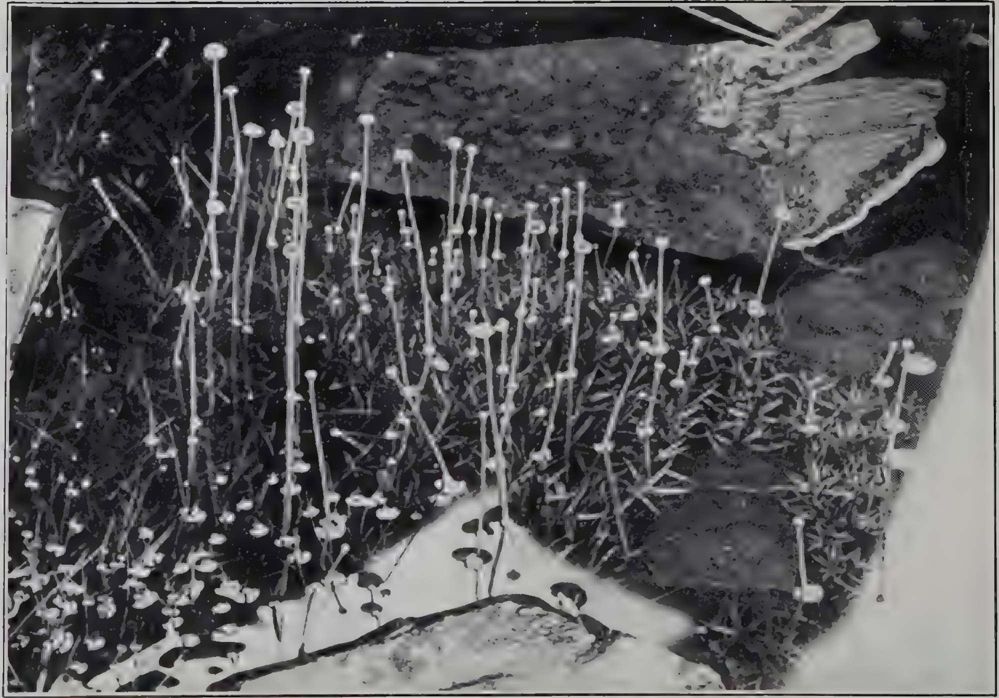


FIG. 5.—Distribution of two of the most widely-ranging Lusitanian plants, namely *Saxifraga umbrosa* (horizontal shading) and *Euphorbia hiberna* (vertical shading).

To sum up, then, as regards the Lusitanian element in the flora of our district: *Saxifraga umbrosa* and *Euphorbia hiberna* have a wide, discontinuous range, and extend both north and south of our area; *Pinguicula grandiflora*, belonging to what we may call the Kerry group, extends into our district; while the three Heaths before mentioned are not found outside the great mountain-buttress formed by West Galway and West Mayo. Another very interesting southern plant, which cannot be classed with the foregoing on account of its different Conti-



Eriocaulon septangulare, Cregduff Lough, Connemara.

The photograph is taken looking through 6 inches of water; it shows the plants growing on the muddy bottom, and the flower-stems rising into the air. July, 1908.

R. Welch, *Photo.*

To face p. 27.

nental range, is *Habenaria intacta*. This, unlike any of the preceding, is a limestone species. It is confined in Ireland to our district, and has a wide range therein (fig. 17): is unknown in Great Britain, and on the Continent is spread along the Mediterranean from S. France to Asia Minor.

Among the animals which belong to the southern fauna, a branching of the immigration route has occurred, by which one section, including the famous Spotted Slug of Kerry, *Geomalacus maculosus*, has crept up the west coast of Ireland; while an equally characteristic group, including the snail *Helix pisana*, the beetle *Otiorhynchus auropunctatus*, and the woodlouse *Eluma purpurascens*, has colonized the eastern coast. Till lately no case was known among the plants of this eastern-Irish type of Lusitanian: but *Glyceria festucæformis*, a seaside grass, widely distributed in the Mediterranean, and elsewhere known only from the Shannon estuary (plate 26), and from the coast of Co. Down, appears to furnish a good instance.

AMERICAN GROUP.—Characteristic also of the west of Ireland, but in Great Britain either absent or northern—not southern like the preceding section—and on the Continent also absent or northern, is a group of plants which are elsewhere confined to, or characteristic of, the northern United States and Canada. *Sisyrinchium angustifolium* (plate 25) extends south of our district into Kerry and Cork, and occurs thence at intervals to the northern edge of the area. Elsewhere it is confined as a native to temperate North America. *Eriocaulon septangulare* (plate 6) ranges discontinuously from Kerry to Donegal, avoiding the limestone tracts. It reappears in the Hebrides, principally in Skye; and elsewhere is confined, like the last, to North America. *Naias flexilis* is found in Kerry and W. Galway; in Scotland, on the west coast (Colonsay, Perth, Skye (?)); it occurs in a few stations in NW. Europe, but has its head-quarters in North America. *Juncus tenuis*, a plant whose standing as a native is open to discussion, has its Irish head-quarters in Kerry and Cork, occurring also on the Aran Islands, and at Belfast; in Great Britain and on the Continent its limited range is northern and western; and it is abundant in the western United States. Perhaps the most interesting of all the American-Irish group, the orchid *Spiranthes Romanzoffiana*, while it occurs in both the south and north of Ireland (and nowhere else in Europe), does not appear within our area; it is widely spread in Canada and the northern States.

These plants of the far north-west commingle in the west of Ireland with those of the south; and to render this puzzling intermixture of far-removed types more striking, other plants, which in Europe are characteristically alpine or sub-arctic in their distribution, grow in great profusion in this warm, humid area right down to sea-level. *Dryas octopetala* (plate 4), *Arctostaphylos Uva-ursi*, *Gentiana verna* (plate 21), *Euphrasia Salisburgensis* (plate 22) may be mentioned as examples. And so, when studying the flora of western Ireland, we are dealing with a startling mixture of types not to be found elsewhere in the British Islands or in Europe. The pool from which we gather the American Pipewort is fringed with Pyrenean Heathers. The cracks which are filled with the delicate green foam of the Maidenhair (plate 27) are set in Bear-berry and Spring Gentian; *Habenaria intacta*, far from its Mediterranean home, sends up its flower-spikes through carpets of Mountain Avens (see frontispiece); and St. Dabeoc's Heath and the Dwarf Juniper straggle together over the rocky knolls.

The story of the migration of these diverse groups to Ireland can at present be guessed at only; nor do we thoroughly understand how it is that plants of such widely different climatic range have overlapped in the west of Ireland, and still flourish there together. The Kerry-Cornwall-Pyrenean range (to pick out the three foci) of the southern group indubitably points to a former continuous European coast-line, probably to the westward of any portion of the existing shore. The American migration involves much more extensive changes in the distribution of land in former times; but any other theory than that of land-migration seems out of the question. The crux of the problem is reached when we attempt to understand the relation of the Glacial Period to the west-coast flora—and, we may add, to the fauna, since zoological researches are largely responsible for these conclusions as to both South European and North American immigration. That these immigrations are pre-glacial—and possibly very much pre-glacial—seems beyond doubt; and for the present the least difficult explanation of the survival of the southern forms through the Ice Age, would seem to lie in the assumption of a western or south-western extension of the sea-board of the British Isles, furnishing ice-free land with a climate milder than that which must have prevailed over the greater part of Ireland at the period of maximum glaciation.[1] The whole subject is a fascinating one;

---

[1] It should be noted in this connexion that these plants, though of far southern origin, are not in Ireland a lowland or heat-loving group. *Saxifraga umbrosa* is at home on the highest mountain summits; in Mayo *Dabeocia polifolia* ascends to 1900 feet, and *Erica mediterranea* to about 1000 feet; in Kerry *Saxifraga Geum* is found up to 2650 feet, *Pinguicula grandiflora* to 2250 feet, *Euphorbia hiberna* to 1800 feet, *Sibthorpia europæa* to 1700.

but the solution of the difficult problems which it presents is probably still far in the future, when we shall have greatly extended and secured the foundation of geological, zoological, and botanical fact on which alone we can safely build. Meanwhile, the naturalist of speculative mind can profitably peruse the classic essay of Edward Forbes[1] on this subject, and the more recent arguments of Dr. Scharff[2] and Professor Carpenter.[3]

For the rest, the great bulk of the plants composing the western vegetation immigrated from the European continent. As has been pointed out above, the Irish flora as a whole is a reduced British one, just as the British flora is a reduced West European one. And just as on leaving the lighter soils and warmer summers of England, some species remained behind, and do not reappear in Ireland, so the plant-army which has by degrees pushed westward, presumably largely since the Ice Age, to mingle with the fragments of the older flora on the rainy, rock-bound Atlantic sea-board, lost many stragglers on the way, and these again were to a large extent plants which favour a comparatively light soil and sunny climate. The species which are characteristic of the east coast of Ireland, from Louth to Wexford—the driest and sunniest part of the country—are of all other groups those which are conspicuously absent from the west. A number of weed-plants and introduced species belong to this category. Mr. Colgan estimates that such species constitute no less than 22 per cent. of the flora of Co. Dublin; in West Galway or West Mayo this percentage is notably smaller, and in number of individuals the comparison would be much more striking. The weed flora of the west, though as abundant as ever in quantity, is poor in variety; the vegetation of gravelly places and of sand-dunes is similarly restricted. This is especially true of the great metamorphic buttress forming West Galway and West Mayo, which is on many counts the most remarkable botanical province included in our district. Not only do the East Ireland species here reach almost vanishing-point, but a group that is characteristic of the Central Plain, most of which are present in the majority of the western counties, also ceases abruptly on the edge of the metamorphic area. These are in general plants of river-banks and lake-margins on the limestone. Their apparent calcicole range may be due to a dislike of the humus compounds in the water of the great bog district, rather than to a preference for lime. If we shift the boundary of W. Galway and W. Mayo a little westward, so as to exclude the limestone that forms their eastern margin, then we shall see how abruptly this group stops with the change of rock. The group in question may be listed as follows:—

---

[1] Memoirs of the Geological Survey of Great Britain, vol. I. 1846.

[2] On the Origin of the European Fauna. *Proc. Roy. Irish Acad.*, ser. 3, III., 427–514. 1897. The History of the European Fauna. Constable. 1899. European Animals. Walter Scott. 1907.

[3] The Mingling of the North and the South. *Irish Nat.*, v., 57–68. 1896. The Problems of the British Fauna. *Natural Science*, xi., 375–386. 1897.

Thalictrum flavum.
Ranunculus circinatus.
  Lingua.
Nasturtium amphibium.
Stellaria palustris.
Cicuta virosa.
Sium latifolium.
Lysimachia vulgaris.
Elodea canadensis.
Sagittaria sagittifolia.
Butomus umbellatus.
Carex paludosa.
Glyceria aquatica.

The number appended to each of the western county-divisions below shows how many of these thirteen species occur in each:—

Limerick,	12
Clare,	10
Galway SE.,	12
Galway W.,	0
Galway NE.,	9
Roscommon,	13
Mayo E.,	6
Mayo W.,	2
Sligo,	9
Leitrim,	6
Fermanagh,	12

The poverty of W. Galway and W. Mayo as regards this plant-group is sufficiently obvious. Certain other species of similar habitat might be added to this list, were it not that lakelets and marshy ground adjoining areas of calcareous marine sands at Bunowen in W. Galway, and on the Mullet in W. Mayo, supply a suitable habitat, and are colonized by a flora widely different from that of the humus-charged bogs and lakes that characterize these divisions (see pp. 68, 90).

The only other point of distribution to which attention need be drawn at this stage is the interesting fact that certain species have been left stranded on the western islands, being now absent from the adjoining mainland. Reduced competition on the islands is probably accountable for this, and possibly in some cases smaller rainfall. The present isolation of these plants is in most instances no doubt due to the extinction of neighbouring mainland stations, though in one or two cases direct introduction from a distance may have occurred.

Thus, the Aran Islands, which consist of a shelf of limestone with a peculiar flora fully reflecting that of the adjoining Burren district of Clare, are the only Irish habitat of *Astragalus Hypoglottis*, and the only station on the west coast for *Trifolium* *striatum.* *Helianthemum guttatum*, which grows on Inishbofin and Inishturk, is elsewhere in Ireland found only in Co. Cork. *Trifolium arvense* is on the west coast found only on Aran and Inishturk. *Silene acaulis* on Clare Island has its next station in Co. Sligo. Inishkea, a mere wave-washed reef of gneiss, possesses two plants (*Convolvulus arvensis* and *Hyoscyamus niger*, both probably originally introduced) which are not found elsewhere in the whole Mayo-Galway metamorphic area.

PROGRESS OF BOTANICAL INVESTIGATION.

While no attempt at a detailed history of botany in the West of Ireland can be made here, a brief reference to the first discovery in the district of some of its more celebrated plants may be of interest.

To Rev. **Richard Heaton**, D.D., of Dublin, "the first Irish botanist," we owe the earliest discovery of *Dryas octopetala* and *Gentiana verna*, "in the Mountaines betwixt Gort and Galloway"; probably also of *Saxifraga umbrosa* and *Euphorbia hiberna* (though not certainly from our district), which appear without locality or finder in William How's "Phytologia Britannica," 1650, where these earliest Britannic records for four of our interesting plants are enshrined. Of Dr. Heaton little is known, except that he contributed many plants to How's "Phytologia" and Merrett's "Pinax." "I cannot collect any anecdotes of him . . . from the number and rarity of the subjects recorded, he must have been a person of considerable knowledge in his way."[1]

Edward Lhwyd or Lloyd (1670–1709), M.A. of Oxford, sometime Keeper of the Ashmolean Museum, a skilled antiquary and naturalist, seems to have travelled a good deal in Ireland in and about the year 1699. He added to the Irish flora *Potentilla fruticosa* (from L. Corrib), *Dabeocia polifolia* ("mountains of Galloway and Mayo"), *Adiantum Capillus-Veneris* (from the Aran Islands), and probably also *Arenaria ciliata* (from Ben Bulben).[2]

The publication of the "Botanologia Universalis Hibernica" of **John K'Eogh**, M.D., at Cork in 1735 gave the first station for *Spiræa Filipendula* (Burren), and also for *Teucrium Scordium* (on the banks of the Shannon near Limerick—where it has only recently been rediscovered). This book was mainly a herbal, and the localities in it are not numerous.

Walter Wade, M.D., first Professor of Botany to the Dublin Society, did much to advance our knowledge of Irish plants, and was the first finder of several of our western rarities. In his "Catalogus Plantarum rariorum in Comitatu Gallovidiæ, præcipue Cunnamara inventarum," 1802, we get the first record of *Eriocaulon septangulare* and *Lycopodium inundatum*; while his "Plantæ Rariores in Hibernia inventæ," 1804, contains the earliest publication of *Saxifraga umbrosa* as a plant of our district, and also of *Matthiola sinuata* (from Straw Island, Aran).

---

[1] Pulteney: Progress of Botany in England, II., 194. 1790.

[2] *Phil. Trans.*, xxvii., 524-526. 1712.

Meanwhile **James Townsend Mackay**, first curator of Trinity College Botanic Garden, had entered the lists, and had begun his course of vigorous field-work in Ireland. In 1805 he discovered *Arabis ciliata* (at Renvyle), next year *Arenaria ciliata* (on Ben Bulben), and about the same time *Helianthemum vineale* (in Aran). These were followed by the finding in 1830 of *Erica mediterranea* (on Urrisbeg). Local botany was by this time attracting considerable attention, and henceforth discoveries were announced in fairly rapid succession. **William Thompson**, the author of the "Natural History of Ireland," and **Robert Ball**, visiting the Aran Islands in 1834, obtained *Astragalus Hypoglottis* and *Allium Babingtonii*; and about the same time **William MacAlla**, the brilliant phycologist, sent up to Mackay *Erica Mackaii* from near Roundstone. A couple of years later **John Wynne**, of Hazelwood, discovered two of the best of the Ben Bulben alpines, namely, *Arabis petræa* and *Saxifraga nivalis*. Meanwhile Dr. **David Moore** was hard at work under the Ordnance Survey at the flora of the north-east: his appointment in 1839 as Director of Glasnevin Botanic Garden gave him an opportunity of extending his researches; and four years later he announced the discovery of *Inula salicina* on Lough Derg, still its only station in the British Isles, which was followed by the finding of *Ajuga pyramidalis* on Aran in 1854. About this period we find a galaxy of rare plants discovered in the west:—*Sisyrinchium angustifolium* at Woodford in 1845 by **John Lynam**; *Naias flexilis* at Roundstone in 1850 by **Daniel Oliver**, who two years later collected *Euphrasia Salisburgensis* in Aran: *Epipactis atro-rubens* in Burren in 1851 by Rev. **Thaddeus O'Mahony**; the puzzling *Potamogeton Kirkii* at Maam in West Galway by **Thomas Kirk** in 1853; and *Viola stagnina* at Gort in 1857 by **Alexander Goodman More**, who had by this time become deeply interested in the flora of the west of Ireland. As late as 1864—the year in which More proposed to David Moore the preparation of "Cybele Hibernica"—came the best discovery of all, when Miss **Frances M. More**, staying, with her brother, with friends at Castle Taylor, picked up an inconspicuous little orchid which proved to be *Habenaria intacta*. *Helianthemum* *guttatum* was collected on Inishbofin by **William MacMillan** Inspector of Schools, in 1871 or 1872. The west was now tolerably well known so far as the extent of its flora was concerned, though distributional studies were as yet hardly begun. During the eighties, exploration was carried out more energetically than ever before by **Henry Chichester Hart, Richard Manliffe Barrington, Samuel Alexander Stewart, Richard Prendergast Vowell**, and **Thomas Hughes Corry**; the value of their work lay in the great advance it made in our knowledge of the distribution of plants in the district, rather than in the discovery of individual rarities. Though the least sensational, this was the most fruitful period of research in western Ireland. During the nineties several valuable additions were made to the flora, including *Potamogeton lanceolatus*, new to Ireland and very rare in Great Britain, obtained in Co. Clare by **Patrick B. O'Kelly**; *Scirpus triqueter*, shown by **R. D. O'Brien** to be abundant on the banks of the Shannon below Limerick, and *Nitella tenuissima*, found near Galway by **Henry** and **James Groves**. During the last decade botanists have not been idle. *Pyrola secunda*, searched for in vain in Ireland since its first discovery in the north-east over seventy years ago, has been found in Co. Fermanagh by **W. N. Tetley**; and *Rosa hibernica*, *Glyceria festucæformis*, &c., in Limerick or Clare by Miss **M. C. Knowles** The last few years have also been highly fertile in the more exact working out of the range of important groups and species, and in the study of critical plants, such as belong to the genera Fumaria, Rubus, Alchemilla, Hieracium, Euphrasia, and Chara. The same period has witnessed the first attempt at a synthetic, as opposed to an analytic, treatment of the flora—a study of vegetation as a whole, and of the composition and ecology of natural plant-groups, rather than a continuation of the search for rare species, which is now in the West of Ireland a branch of botanical study which can no longer hold out to the explorer the almost boundless possibilities which it once possessed.

INDEX TO INTRODUCTION.

Age of the flora, 28.
Agriculture, limit, 7.
Allen, Lough, 3.
Alpine plants, 19.
Altitude, influence of, 11.
American plants, 27.
Arbutus Unedo, 25.
Area of district, 1.
Arigna Mountains, 4.
Arra Mountains, 2.
Arrow, Lough, 3.
Atlantic type plants, 23.

Ben Bulben, 4, 9.
Biography, 31.
Birch wood, 16.
Boderg, Lough, 3.
Bog vegetation, 14.
Bogs, 5, 13.
  Central Plain, 13.
  Connemara, 14.
  West coast, 14.
Boulder-clay, 5.
Boundaries of district, 1.
Burren, 8.

Calcicole plants, 11.
Calcifuge plants, 11.
Cantabrian plants, 25.
Carboniferous limestone, 4.
  sandstone, 4, 8.
Carra, Lough, 3.
    woods, 17.
Carrowmore Lough, 3.
Central Plain, 7, 12.
  bogs, 13.
  plants, 29,
Character of the flora, 22.
Clare-Galway River, 3.
Climate, 5.
Coal-measures, 10.
Coast-line, 2.
Conn, Lough, 3.
Connacian type plants, 25.
Connemara, 8.
  bogs, 14.
Copses, 15.
Correl Glen, wood, 16.
Corrib, River, 2.
  Lough, 3.
Crag-land, 8.
Crag-land wood, 16.
Croaghaun, 3.
Croaghpatrick, 3.
Cuilcagh, 4.
Cullin, Lough, 3.
Curraun Achill, 21.

Dabeocia polifolia, 26.
Derg, Lough, 3.
Devonian rocks, 4.
Distribution of plants, 22.
Drift, 5.
  area, 7.
Driftless area, 8.
Dunes, 18.
Dwarfing by exposure, 6.

Eastern plants, 29.
English type plants, 23.
Erica ciliaris, 26.
  cinerea on limestone, 12.
  Mackaii, 26.
  mediterranea, 26.
  vagans, 26.
Ericaceous vegetation, 8, 13, 14.
Erne, Lough, 3.
    woods, 17.
  River, 2.
Erris, 8.
Eskers, 5.
Euphorbia hiberna, 25.
Exposure, 6.
Extent of flora, 22.

Fergus, River, 2.
Flora, age, 28.

Flora, American, 27.
    Cantabrian, 25.
    character, 22.
    Iberian, 25.
    Lusitanian, 25.
    origin, 24, 28.
    subdivisions, 7, 11.
    total, 22.
Frost, 6.

Galtees, 3.
Gara, Lough, 3.
Garryland wood, 16.
Geology, 4.
Germanic type plants, 23.
Gill, Lough, 3.
Glacial drift, 5.
    period, 28.
Gneiss, 4.
Granite, 4.
Grass-lands, 7, 12.

Habenaria intacta, 26.
Hazel wood, 16.
Heath-land, 7.
Heaton, Rev. R., 31.
Highland plants, 19, 23.
Hydrophile grass-land, 13.

Iberian plants, 25.
Island plants, 30.
Isophytic lines, 23.
Isotherms, 5, 11.

Juncus tenuis, 27.

K'Eogh, John, 31.
Key, Lough, 3.

Lake-shores, 9.
Lakes, 3.
Latitude, 1, 11.
Lhwyd, E., 31.
Limestone area, 4.
    crags, 8.
    grass-lands, 13.
    lake-shores, 9.
    mountains, 9.
    pavements, 8.
Limit of agriculture, 7.
Longitude, 2.
Loughs, 3.
Lusitanian plants, 25.
Luxuriance of vegetation, 7.

Maam Turk Mountains, 3.
Mackay, J. T., 32.
Maritime formations, 17.
Mask, Lough, 3.
Meenawn, 21.
Mesophile grass-land, 13.
Metamorphic area, 8.
Mica schist, 4.
Migration of plants, 22, 28.
Moisture, 6.
Monmor bog, vegetation, 14.
Moor, sub-alpine, 15.
Moors, 13, 14.
Moore, David, 32.
More, A. G., 32.
Mountains, 3.
Moy, River, 2.
Mweelrea, 3.
    summit flora, 21.

Naias flexilis, 27.
Nephin, 3.
    summit flora, 21.
Nephinbeg, 3.
Nomenclature, vii.

Old Red Sandstone, 10.
Origin of the flora, 28.
Ox Mountains, 3, 9.

Partry Mountains, 3.
Peat bogs, 5.
Petrography, 4.
Pinguicula grandiflora, 25.
Plain, Central, 7.
Plantago sward, 18.
Position of district, 1.

Quartzite, 4.

Rainfall, 6.
Range of alpines, 20.
Ree, Lough, 3.

Rivers, 2.
Rocks, 4.

Salt-marsh flora, 18.
Sand-dunes, 18.
Sandstone, Carboniferous, 8.
    hills, 10.
    soils, 5.
Saxifraga Geum, 25.
    umbrosa, 25.
Scottish type plants, 23.
Sea-rocks, flora, 18.
Shale area, 10.
    soils, 5.
Shannon, 2.
    lakes, 9.
Sibthorpia europæa, 25.
Silurian area, 8.
    rocks, 4.
Sisyrinchium angustifolium, 27.
Size of district, 1.
Slate soils, 5.
Slieveanieran, 4.
Slieve Bernagh, 3.
    Carran, woods, 16.
Spanish plants, 25.
Spiranthes Romanzoffiana, 27.
Soils, 4, 5.
Southern plants, 25.
Sub-alpine sward, 21.
Suck, River, 2.
Symbols, vii.

Temperature, 5, 11.
Total flora, 22.
Truskmore, summit flora, 21.
Twelve Bens, 3.

Upper Carboniferous rocks, 4.

Vegetation types, 10.
Vegetational subdivisions, 7.

Wade, W., 31.
West Coast Bogs, 14.
    Ireland plants, 24.
Wind, 6.
Woods, 15.

Xerophile grass-lands, 12.

TOPOGRAPHICAL SECTION

TOPOGRAPHICAL SECTION.

THE district to which this Flora refers comprises eleven out of the forty divisions into which Ireland is divided in "Irish Topographical Botany." These are:—

8. Limerick.
9. Clare.
15. Galway SE.
16. Galway W.
17. Galway NE.
25. Roscommon.
26. Mayo E.
27. Mayo W.
28. Sligo.
29. Leitrim.
33. Fermanagh.

These divisions are, of course, merely political, not botanical, and though sometimes a strong natural boundary is followed, they are, on the whole, quite unnatural biologically. However, their habitual use for all practical purposes renders their adoption for botanical work almost a necessity, and for census and distributional purposes they answer well enough. The great natural botanical divisions of the district have been generally described in the foregoing pages (pp. 7–22). There now ensues a brief description of each of the topographical divisions; and to these is appended a description of the more interesting places lying within each division. Some of these represent areas naturally distinct, such as islands, or lakes with their shores, or mountain-ranges. Others are not natural, but only convenient, areas; these are chiefly towns with their neighbourhoods. The last are included because the visitor is generally domiciled in a town, and often wishes to know what is the nature of the flora of the environs, and what interesting plants he may hope to find in the course of a day's ramble.

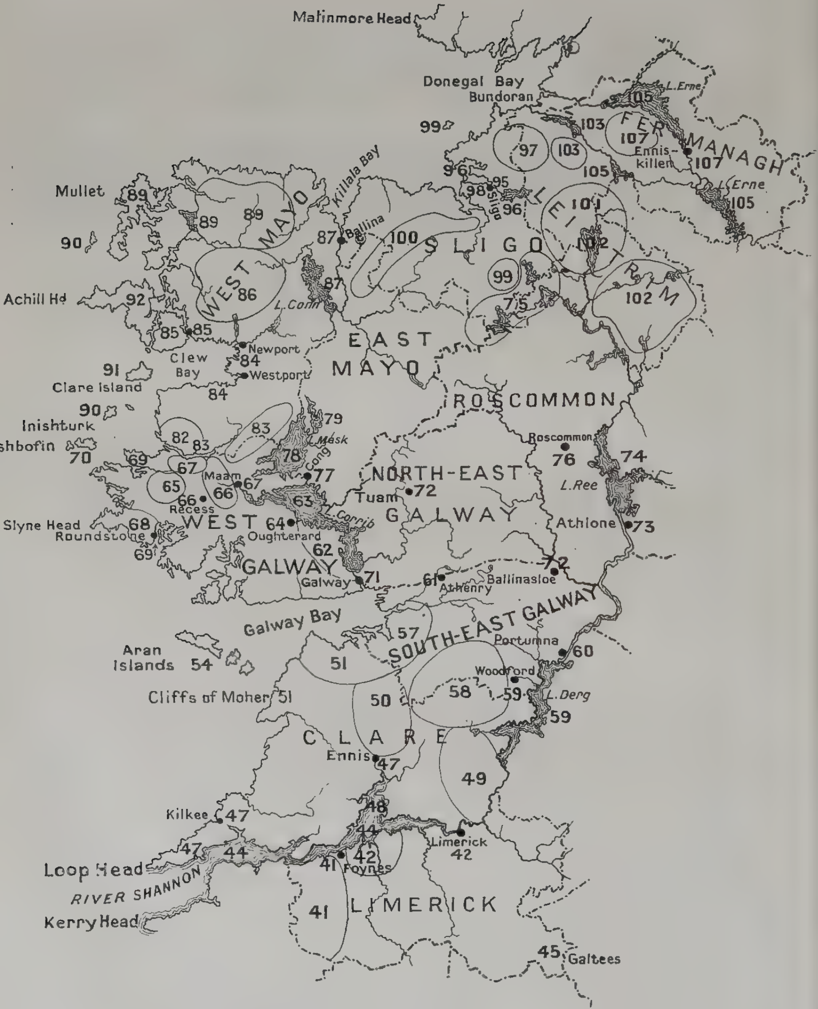


FIG. 6.—Key-Map to Topographical Section.

The numbers on the map indicate the pages on which the various areas will be found described.

REFERENCE TO TOPOGRAPHICAL KEY-MAP.

No. on map and p. in book	
41	West Limerick.
41	Foynes.
42	Askeaton Limestones.
42	Limerick City.
44	Shannon Estuary.
45	Galtees.
47	Monmor Bog & Loop Hd.
47	Ennis.
48	Fergus Estuary.
49	Slieve Bernagh.
50	Central Clare Limestones.
51	Cliffs of Moher.
51	Burren.
54	Aran Islands.
57	Ardrahan Limestones.
58	Slieve Aughty.
59	Woodford.
59	Lough Derg.
60	Portumna.
61	Athenry.
62	Moycullen Limestones.
63	Lough Corrib.
64	Oughterard.
65	The Twelve Bens.
66	Recess.
66	Maam Turk.
67	Maam.
67	Kylemore and Benchoona.
68	SW. Connemara.
69	Roundstone.
69	Renvyle.
70	Inishbofin.
71	Galway City.
72	Tuam.
72	Ballinasloe.
73	Athlone.
74	Lough Ree.
75	Curlew Hills and Boyle Lakes.
76	Roscommon Town.
77	Cong and Clonbur.
78	Lough Mask.
79	Lough Carra.
82	Mweelrea mountain-group.
83	Killery Harbour.
83	Maamtrasna or Partry Mtns.
84	Croaghpatrick.
84	Westport and Newport.
85	Mallaranny.
85	Curraun Achill.
86	Nephin and Nephinbeg.
87	Ballina.
87	Lough Conn.
89	Erris.
89	Carrowmore Lake.
89	Mullet.
90	Inishkea.
90	Inishturk.
91	Clare Island.
92	Achill Island.
95	Sligo Town.
96	Lough Gill.
96	Rosses Point.
97	Ben Bulben Plateau.
98	Knocknarea.
99	Keshcorran and Carrowkeel.
99	Inishmurray.
100	Ox Mtns. and Slieve Gamph.
101	Cuilcagh and Slievenieran.
102	Lough Allen.
102	South Leitrim.
103	Manorhamilton and Glenade.
103	Lough Melvin.
105	Lough Macnean.
105	Lough Erne.
107	Enniskillen.
107	Poulaphuca and Carrick.

THE COUNTY OF LIMERICK.

Limerick forms the most southern portion of our district, and the only part lying on the eastern (here southern) side of the River Shannon. It abuts southward and westward on Cork and Kerry, the warmest and wettest part of Ireland, famous as being the head-quarters of such rarities as *Saxifraga Geum*, *Arbutus Unedo* (neither found in the British Isles outside that area), *Sibthorpia europæa*, *Pinguicula grandiflora*, *Euphorbia hiberna*, *Trichomanes radicans*. But Limerick itself, probably owing to difference of physical conditions, contains but few of these treasures.

Area, 1064 square miles. The whole northern boundary is formed by the Shannon estuary, with muddy creeks running far inland, and much salt-marsh (see THE SHANNON ESTUARY, p. 44). The greater part of the county is a low-lying tract of limestone, broken by occasional Old Red Sandstone ridges and low volcanic hills. The most marked change occurs in the west, where a high mass of Coal-measures rests on the limestone, producing bare hills with a heavy clay soil and a calcifuge flora (see under WEST LIMERICK, p. 41). Around Askeaton the limestone lies bare, and has a characteristic flora (see THE ASKEATON LIMESTONES, p. 42). The middle and south have been very little explored botanically, and work has centred around Limerick (see LIMERICK CITY, p. 42) and the Shannon. In the extreme SE. the lofty range of the Galtees crosses a corner of the county, the county boundary passing over the summit of Galtymore, 3015 feet (see THE GALTEES, p. 45). The rivers of the county are unimportant, and lakes small and few. Low-level peat bog is nearly absent. Two-thirds of the area is under grass, and about one-fourth under crops.

Total flora, 720 species[1]—a very high total, considering that the area is as yet incompletely explored. The great estuary of the Shannon, with the low-lying limestone tract which fringes it, exercises a strong influence on the flora, and calcicole, marsh, and salt-marsh species are especially well represented. One plant, *Rosa obtusifolia*, is unknown elsewhere in Ireland. Among the rarer species which occur are *Rosa hibernica*, *Euphrasia Salisburgensis*, *Teucrium Scordium*, *Rumex maritimus*, *Euphorbia hiberna*, *Scirpus triqueter*, *Glyceria festucæformis* (plate 26), *G. Foucaudi*.

---

[1] In these statistics, the word *species* is used in an aggregate sense, the standard employed being that adopted in "Irish Topographical Botany." This gives a conservative estimate of the flora, the fruticose Rubi, the hypnoid Saxifrages, and other groups each ranking as one species. For the purposes of a just comparison this plan is necessary, on account of the uneven working out of segregates such as the Brambles, in the various divisions.

WEST LIMERICK.

West of Newcastle, Rathkeale (Ráṫ ᵹaola, the rath of Gaola), and Foynes, a mass of Coal-measures covers the limestone, extending into N. Kerry, and having many summits of over 1000 feet elevation. Here extensive rushy grass-heaths prevail on the slopes, with bogs along the watersheds. The vegetation is a fully calcifuge one, in marked contrast to that of the limestone plain on which these hills look down. The flora is rather uninteresting on the whole, as is usual on the Coal-measures. The grass lands yield very little, the bogs are likewise poor, *Drosera anglica* and *Carex limosa* being the best plants. The extensive woods of Mount Trenchard and district, overlooking the Shannon, are more productive, and harbour *Neottia Nidus-avis*, *Carex strigosa*, *Milium effusum*, *Festuca sylvatica*, &c. Along the White River grow two rare roses, *R. hibernica* and *R. involuta*; three others, *R. obtusifolia*, *R. stylosa*, and *R. glauca* are not unfrequent in this area. The Galey River (Aḃa ᵹ̇áile, river of Gál (?), or Gáile (?)), which flows west from the centre of the district, is fringed with *Euphorbia hiberna* in abundance; and north of its source, on the eastern slope, *Epilobium angustifolium* has its only Munster station at Glenastar waterfall (ᵹleann Eaꞃa Ꝺáiꞃe, the glen of the cataract of Dáire).

M. C. Knowles and C. G. O'Brien: The Flora of the Barony of Shanid. *Irish Nat.*, xvi. 185–201. 1907.

Foynes.—The little village of Foynes (Ꝼainᵹ, a raven) forms a good centre for work in West Limerick and along the Shannon. It offers a fine contrast of vegetations. East of the town are low-lying limestones, frequently bare of covering, and intersected with extensive muddy tidal channels. West of Foynes the ground rises at once into hills formed of shales and sandstones, with fine woods and a calcifuge flora. Some of the plants to be found about Foynes are mentioned under the heads of West Limerick, The Shannon Estuary, and The Askeaton Limestones. Among the most interesting maritime species which grow close to Foynes are *Glyceria festucæformis* and *G. Foucaudi*. *Artemisia maritima* is plentiful by the shore, and *Hordeum secalinum* and *Tragopogon porrifolius* grow close by. Other plants which grow about Foynes include *Cochlearia anglica* and var. *Hortii*, *Viola hirta*, *Crepis biennis*, *Calamintha officinalis*, *Galeopsis versicolor*, *Ophrys apifera*, *Potamogeton densus*, *Agropyron pungens*, *A. acutum*. Good hotel.

M. C. Knowles and C. G. O'Brien: The Flora of the Barony of Shanid. *Irish Nat.*, xvi. 185–201. 1907.

THE ASKEATON LIMESTONES.

The low-lying bare limestones of Central Clare are continued southward across the Shannon into Co. Limerick, and form a conspicuous feature about Askeaton and Mullough. The Upper Carboniferous Limestone, which forms the 'crags' of Clare, is here replaced by the Lower Limestone. This area exhibits a flora of the characteristic facies of Burren, but very much reduced. *Euphrasia Salisburgensis* is still abundant, and with it are *Arabis hirsuta*, *Rubia peregrina*, *Asperula cynanchica*, *Juniperus nana*, *Ceterach officinarum*. *Viola hirta*, *Geranium columbinum*, *Cornus sanguinea*, *Carlina vulgaris*, *Spiranthes autumnalis*, *Orchis pyramidalis*, are calcicole plants which are also present in more or less quantity.

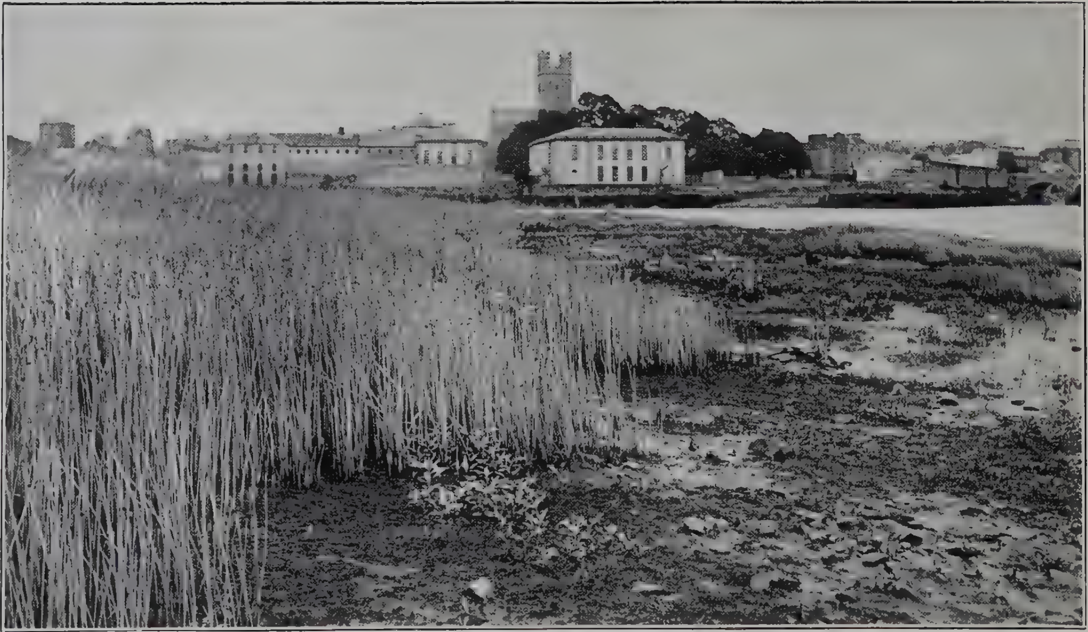
The noticeable feature of the Limerick limestones is the great reduction of the characteristic crag flora as compared with even the most southerly portion of the limestones of Clare, immediately to the northward. This may be the result of the barrier offered to plant-migration by the wide estuary of the Shannon, or the explanation may be lithological rather, depending on the relative suitability for this group of plants of the Upper and the Lower Limestone.

Askeaton.—About Askeaton (Eaꞅ Ᵹeıṗꞇıne, Geiphtine's cascade) itself, a straggling village built on a tidal stream running between rocky limestone banks, decorated with interesting medieval ruins, will be found *Linum angustifolium*, *Mariana lactea*; *Orobanche Hederæ* and *Euphrasia Salisburgensis* on walls; *Salvia Verbenaca*, *Fœniculum vulgare*, *Verbena officinalis*, *Calamintha officinalis*, *Dipsacus sylvestris*, *Allium vineale*, *Festuca Myuros*. The neighbourhood is distinctly interesting to the botanist.

M. C. Knowles and C. G. O'Brien: The Flora of the Barony of Shanid. *Irish Nat.*, xvi. 185–201. 1907.

LIMERICK CITY.

The visitor tarrying in Limerick (Luımneaċ, whence Hlymrek (Old Norse), bare place or river, originally lower Shannon) for a little botanizing may spend an interesting day close to the city. The district is low-lying, formed of Carboniferous limestone with patches of volcanic ash; and the solid geology is obscured by wide tracts of alluvium. The more interesting plants are either hydrophile or halophile, haunting wet meadows and ditches, or the muddy banks of the Shannon. To the last category belongs the most interesting of the local species—namely, *Scirpus*



SCIRPUS TRIQUETER BY THE SHANNON AT LIMERICK.

The substratum is black tidal mud At high water the plant is half submerged. It is accompanied by *S. Tabernæmontani*, *Alisma Plantago-aquatica*, *Apium nodiflorum*, *Polygonum Persicaria*, *Potamogeton densus*, Chara sp., and green Algæ. July, 1908.

R. Welch, Photo.

To face p. 43.

triqueter, growing in great profusion on the mud of the foreshore from Limerick down for some miles. With it are associated *Cochlearia anglica* and var. *Hortii*, and *Nasturtium sylvestre. Typha angustifolia* grows very tall on the tidal foreshore. The adjoining marshes yield *Leucojum æstivum*, *Hordeum secalinum*, with great abundance of *Allium vineale* and *Carex riparia*. Near the river above tidal influence grow the four British Duckweeds, *Ranunculus circinatus*, *Polygonum mite*, *Potamogeton densus*, *Carex aquatilis* var. *virescens*, *Sium latifolium*, *Sagittaria sagittifolia*, *Butomus umbellatus*, &c. By roadsides and in meadows *Pimpinella magna* and *Crepis biennis* are characteristic plants.

Certain old quarries and waste ground in Limerick city have yielded a remarkable crop of aliens, owing to the dumping of rubbish of various sorts. While most of these are but fleeting casuals, others, such as *Lepidium latifolium*, *L. Draba*, and *Aster* sp., have established themselves.

Lough Gur.—A ten-mile drive southward from Limerick brings one to the very interesting lake called Lough Gur (Loċ Gair, lake of Gar), the flora of which includes *Rumex maritimus*, *Nasturtium sylvestre*, *Ceratophyllum demersum*, *Chenopodium rubrum*, *Ranunculus circinatus*, and other species rare in Ireland. Bogs near by yield *Lemna polyrhiza*, *Potamogeton plantagineus*, *P. obtusifolius*, *Sparganium minimum*, &c. About the same distance WSW. of Limerick lies the fine old demesne of CURRAGH CHASE (Curraċ, race-course), the flora of which includes *Hypopithys multiflora*, *Neottia Nidus-avis*, and *Carex Pseudo-cyperus*.

Adare (Áṫ Dara, the ford of the oaks), situated on the River Maigue (An Ṁáiġ), still tidal here although 8 miles from the Shannon, is famous for its castle and abbey ruins, and for its fine demesne. It is a small village with a pleasant hotel.

Euphorbia hiberna is recorded from here, though not seen recently. *Hieracium serratifrons* var. *lepistoides* is abundant at Adare Manor, with *Ophrys apifera*, *Poa nemoralis*, &c. *Rhamnus catharticus* and *Crepis biennis* also occur.

Castleconnell (Caisleán Ó gConaing, the O'Conaings' castle), six miles up the river, famous for its salmon-fishing, where the Shannon falls picturesquely over a series of limestone steps, is the lower limit for some of the characteristic Shannon plants, such as *Teucrium Scordium* and *Galium boreale*; its flora also includes *Stellaria palustris*, *Rhamnus catharticus*, *Rubus myricæ* var. *hesperius*, *R. saxatilis*, *Apium inundatum* var. *Moorei*, *Potamogeton nitens*. There is an extensive bog close at hand—one of the few in Co. Limerick—with *Drosera anglica*, *Andromeda Polifolia*, *Lastrea spinulosa*, &c. Good hotel.

Glenstal (Ᵹleann Sꞇal (?), glen of stallions (?)) is a fine demesne on the hills ten miles east of Limerick. *Trichomanes radicans* has been found near there in more than one spot, and *Hymenophyllum tunbridgense.* The glen yields several local species, such as *Lychnis diurna*, *Prunus Padus*, *Crepis paludosa*, and *Festuca sylvatica*; and some plants are naturalized there, including *Geranium Phœum*, *G. sylvaticum*, *Saxifraga granulata.*

R. A. Phillips: Some Notes on the Flora of Limerick. *Journ. Lim. Field Club*, iii., 32–35. 1905. R. Ll. Praeger: Notes on the Limerick Flora. *Irish Nat.*, ix., 260–265. 1900.

THE SHANNON ESTUARY.

The Shannon (An ꞇSionainn), greatest of the rivers in the British Isles, becomes tidal at Limerick, and reaches the ocean at Loop Head, some 55 miles distant. The great estuary thus formed widens from a few hundred yards to 9 miles at the mouth, and displays every gradation of shore from deep mud at the upper end to full marine conditions, with high cliffs or sand-dunes. The wide estuary of the Fergus (see Fergus Estuary, p. 48) opens into the Shannon on the northern side, and in itself provides a wide expanse of gravel, mud, and islands. Altogether there are some 200 miles of shore-line here, much of which has not yet been thoroughly explored.

The muddy upper reaches, below Limerick, are characterized by a reedy zone, in which *Phragmites communis*, *Scirpus Tabernæmontani*, *S. maritimus*, and the rare *S. triqueter*, play a leading part. These are backed by salt-marsh and wet meadow-land, as described under the heading Limerick (p. 42). Lower down is a very extensive middle section with stony, gravelly, or muddy shores, characterized by such plants as *Apium graveolens*, *Œnanthe Lachenalii*, *Artemisia maritima*, *Statice rariflora*, *Beta maritima.* Here, too, belong two very rare grasses—*Glyceria Foucaudi*, which has its only Irish stations on muddy flats about Foynes and the Fergus estuary, and *G. festucæformis*, which is abundant on the gravelly shores of islets in the same vicinities. Below this again, from Tarbert (Ꞇaiꞃbeaꞃꞇ, an isthmus) down, more open marine conditions prevail. The rocks and cliffs support *Spergularia rupestris* and *Crithmum maritimum*, and there are sands with *Glaucium flavum*, *Raphanus maritimus*, *Euphorbia portlandica*, and so on.

S. A. Stewart: Report on the Botany of South Clare and the Shannon. *Proc. Royal Irish Acad.*, ser. 3, i., 343–369. 1890. M. C. Knowles and C. G. O'Brien: The Flora of the Barony of Shanid. *Irish Nat.*, xvi., 185–201. 1907. M. C. Knowles and R. D. O'Brien: A Botanical Tour in the Islands of the Fergus Estuary and adjacent Mainland. *Irish Nat.*, xviii., 57–68. 1909.

THE GALTEES.

The eastern boundary of Co. Limerick crosses the high range of the Galtees (Gailte, or Crota Cliaċ) about their middle, passing through the highest point (Galtymore, 3015 feet). But the Limerick portion of the Galtees can only technically be included in our district. The range belongs, along with the adjoining Comeraghs (Comaraiġ, places of confluences), and Knockmealdown Mountains (Cnoc Maoildoṁnaiġ, Maoldomhnach's Hill), to the south, not the west, of Ireland; and even politically, it is only an irrational south-eastward prolongation of the Limerick boundary that brings these hills into the county at all. In any case, all the best botanical ground lies on the Tipperary side of the boundary; and but few interesting plants are found on the Limerick portion of the range. Indeed, *Meconopsis cambrica*, in Glancushnabinnian (Gleann Ċoir' na binne (?), the glen beside the peak (?)), and *Saxifraga stellaris*, *S. sponhemica*, and *Salix herbacea* on the heights above, are the best plants which these lofty hills add to the flora of Limerick. But a few hundred yards across the county boundary, above Lough Curra (Loċ Corra (?), lake of Corra (?)), we may gather *Arabis petræa* (only other Irish station is Glenade), *Sedum Rhodiola*, *Oxyria digyna*, *Asplenium viride*, and other plants unknown in Limerick.

The visitor can stay at Mitchelstown, Cahir (Caṫair Dúin Iargaiġ, the *cathair* of the fort of the fishing), or Tipperary.

H. C. Hart: On the Botany of the Galtee Mountains, Co. Tipperary. *Proc. Roy. Irish Acad.*, 2nd Ser., iii. (Science), 392-402. 1881.

THE COUNTY OF CLARE.

A large, varied, and most interesting county, with an area of 1348 square miles. On the southern border, for a length of 55 miles as the crow flies, Clare (An Clár, the plain) fronts the wide sea-inlet and estuary of the Shannon and Fergus; and the western side, equally extensive, faces the open Atlantic, where denudation has resulted in magnificent cliff-ranges. The eastern boundary is formed largely by Lough Derg. The SW. half of the county, roughly speaking, is composed of Coal-measures; the NE. half, in which botanical interest centres, of Carboniferous limestone, with two groups of hills of Old Red Sandstone and Silurian rocks in the east. The limestone has very important outliers in the Aran Islands, three tilted reefs of bare rock lying across the mouth of Galway Bay, 4 to 15 miles off the Clare coast. The highest hill is the Old Red Sandstone core of Slieve Bernagh in the SE., rising to 1746 feet. Rivers are small and unimportant. Lakes are numerous in the centre and east. Grass-land occupies about 60 per cent. of the surface; crops, less than 20 per cent; barren land, 10 per cent.

In the NW., in the famous district of Burren, the limestone rises into bare terraced hills of 1000 feet or more in height, yielding a very remarkable flora (see THE BURREN HILLS, p. 51). This botanical paradise is repeated, in an almost more attractive guise, in Aran (see THE ARAN ISLANDS, p. 54), and is continued in a somewhat reduced form southward, over low-lying limestone pavements to the Shannon (see THE CENTRAL CLARE LIMESTONES, p. 50, and ENNIS, p. 47); and the limestone flora mixes with some rare maritime species in the island-studded estuary of the River Fergus (see THE FERGUS ESTUARY, p. 48, and THE SHANNON ESTUARY, p. 44). The wild and bare SW. part of the county, with its undulating grassy Coal-measures, has not been much explored; but a few good plants occur (see MONMOR BOG and LOOP HEAD, p. 47, and ENNIS, p. 47). The non-calcareous hills in the east have yielded, so far, but little to the botanist (see SLIEVE BERNAGH, p. 49; and SLIEVE AUGHTY, p. 58). The shores and islands of Lough Derg are very interesting, but a good deal of the Clare part of this large lake lies on the slates and sandstones, which are not so rich botanically as the limestone shores.

The total flora of the county is 778 species—one of the largest county floras in Ireland. Lime-loving plants are largely represented; and the flora is chiefly remarkable for the interesting intermingling of northern and southern species on the limestone crag-lands of Burren and Aran. Although only one species, *Astragalus Hypoglottis*, is as regards Ireland confined to the county, we are nevertheless in Clare confronted with a galaxy of rare plants unequalled elsewhere in Ireland, whether an Irish or a British standard of rarity be taken. These include *Matthiola sinuata*, *Arabis ciliata*, *Helianthemum vineale*, *Viola stagnina*, *Potentilla fruticosa*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Orobanche rubra*, *Pinguicula grandiflora*, *Teucrium Scordium*, *Ajuga pyramidalis*, *Epipactis atro-rubens*, *Habenaria intacta*, *Sisyrinchium angustifolium*, *Juncus tenuis*, *Potamogeton lanceolatus*, *Eriocaulon septangulare*, *Scirpus triqueter*, *Carex paradoxa*, *Calamagrostis Epigejos*, *Glyceria festucæformis*, *G. Foucaudi*, *Adiantum Capillus-Veneris*, *Isoetes echinospora*.

MONMOR BOG AND LOOP HEAD.

South-westward, Co. Clare tails away in a long wedge between the Atlantic and the Shannon, terminating in the cliffs of Loop Head. This is a wind-swept, almost treeless district of low undulating Coal-measures, with a rather limited flora. Monmor (An Ṁóin Ṁór, the great bog) may be taken as the centre of an extensive bog district, now much reduced by cutting, lying behind Kilrush (Cill Ruis, church of the promontory), Kilkee, and Doonbeg (An Dún Beag, the little fort). Here *Elatine hexandra*, *Eriocaulon septangulare*, and *Isoetes echinospora* have their only Clare station. Numerous bog plants occur, such as Droseras, Utricularias, *Vaccinium Oxycoccus*, *Scutellaria minor*, *Rhynchospora fusca*. *Lobelia Dortmanna* and *Centunculus minimus* are also recorded. The dunes on the coast yield *Viola lutea*, *V. Curtisii*, *Asperula cynanchica*.

Southward, bog-land and dunes give way to poor grasslands and continuous cliffs. The meadows are full of Purple Loosestrife and Ragweed. The cliffs are savage, black, and almost bare of plant-life—the effect of the rapid weathering of the shales; the exposure pushes the maritime plants inland for some distance.

Loop Head (Léim Ċonculainn, Cuchulainn's leap) itself presents an unbroken precipice of about 200 feet. Above, over a considerable area, an almost pure *Armeria maritima* sward occupies the ground. Elsewhere Plantago sward is well developed, giving way on the low hill-tops (about 300 feet) to dwarf Calluna. The rarer plants of the district include *Sagina subulata*, *Statice occidentalis*, *Juncus diffusus*.

Kilkee (Cill Ċaoi, church of Caoi), a bright little watering-place, situated on a delightful bay on the open ocean, forms an excellent centre for the botanist visiting this region.

R. LLOYD PRAEGER: Botanical Notes, chiefly from Lough Mask and Kilkee. *Irish Nat.*, xviii., 32-40. 1909.

ENNIS.

Ennis (Inis Cluana Rámḟada, the island of the bog-meadow of the long rowing) is the chief town of Clare, and is situated near the lower end of the flat limestone depression that occupies the centre of this county, and opens southward into the wide estuary of the Fergus. The surrounding country is interesting botanically, and only half explored. About the River Fergus and lakes near the town grow *Sium latifolium*, *Mimulus* *guttatus*, *Rumex Hydrolapathum*, *Ceratophyllum demersum*, *Hydrocharis Morsus-ranæ*, *Typha angustifolia*, *Butomus umbellatus*; the water flora will repay further work. The limestone crag country which is so characteristic of north Clare is continued down to Ennis on a more limited scale, yielding *Gentiana verna*, *Euphrasia Salisburgensis*, and other members of the Burren flora. The interesting demesne of Dromoland (*infra*), five miles to the SE., adds several good plants to both of the above groups. West and south-west of Ennis, where the Coal-measure hills alter the facies of the vegetation, *Lobelia Dortmanna*, *Trichomanes radicans*, *Polypodium Phegopteris*, and the two Filmy Ferns have been found. For the flora of the great arm of the Shannon estuary that lies below Ennis, see under FERGUS ESTUARY (*infra*). From Ennis the interesting lake and crag district about Corofin and Crusheen (see THE CENTRAL CLARE LIMESTONES, p. 50) can easily be explored, two lines of railway assisting.

THE FERGUS ESTUARY.

The River Fergus (Foꞃġuꞃ, great power (?)), draining central Clare, discharges into the Shannon below Ennis through a wide estuary, guarded at the mouth by a double rampart of limestone islands, behind and among which vast mud-flats extend. The islands are formed of low reefs of rock, many covered with drift, others with the limestone quite bare. The outer ones have their shores open to the tides and waves of the Shannon; the inner ones are surrounded by miles of mud. The majority are inhabited, or grazed, or both. The western shore of the estuary represents the edge of the limestone, and is backed by rising Coal-measure country. The eastern consists of low limestones, with woods and lakes. The limestone flora is represented on the islands by *Arabis hirsuta*, *Viola hirta*, *Cornus sanguinea*, *Rubia peregrina*, *Carlina vulgaris*, *Chlora perfoliata*, *Ophrys apifera*, *Kœleria cristata*. The limestones on the eastern mainland shore are richer, and add to the flora *Saxifraga hypnoides*, *Galium sylvestre*, *Euphrasia Salisburgensis*, *Epipactis atro-rubens*, *Sesleria cœrulea*. The woods, lakes, and marshes of **Dromoland** demesne yield a rich flora, including *Epipactis atro-rubens*, *Carex paradoxa* (elsewhere in Ireland confined to Westmeath), *C. Hudsonii*, *C. riparia*, *C. filiformis*, *C. Pseudo-cyperus*, *Lastrea Thelypteris*, &c. The shores of the islands and adjoining mainland possess several very interesting plants. *Glyceria festucæformis* and *G. Foucaudi* grow abundantly in various places; *Artemisia maritima*, *Statice rariflora*, *Œnanthe*

Lachenalii, *Cochlearia anglica* are characteristic species; *Atropa Belladonna* is thoroughly established on the shores of Coney I.

The Coal-measure country is clayey and boggy as usual. The three Droseras occur, and in the lakes *Lobelia Dortmanna*. *Trichomanes radicans* has been found, and a calcifuge flora prevails (see also under ENNIS, p. 47).

The district is rather inaccessible, and the islands difficult of approach on account of the intricacy of the channels through the slob-land, and the absence of harbours. The explorer can stay comfortably at Newmarket, and Killadysert (Cıll a' Ꝺíꞅıꞃꞇ, the church of the hermitage) also offers accommodation.

M. C. KNOWLES and R. D. O'BRIEN: A Botanical Tour in the Islands of the Fergus Estuary and adjacent Mainland. *Irish Nat.*, xviii., 57–68: 1909.

SLIEVE BERNAGH.

South of the Slieve Aughty anticline, a group of rather bold hills known as Slieve Bernagh (Slıaḃ beaꞃnaċ, gapped mountain) rises picturesquely on the west bank of the Shannon, over the little town of Killaloe, at the south end of L. Derg. These uplands attain an elevation of 1746 feet; they are continued eastward across the Shannon in the lower Arra Mountains (Slıaḃ Aꞃaḋ, mountain of the territory of Ara, outside our district), and south-westward to Cratloe (Cꞃeaꞇḟalaċ, soiled with carcasses). Like Slieve Aughty, these hills are formed of Old Red Sandstone and Silurian rocks, which break through the prevailing limestone; and they are clothed with heather. So far, no plants of great interest are known from the Slieve Bernagh group, *Crepis paludosa* being one of the few records. At the back of Slieve Bernagh, around Lough Graney (Loċ Ᵹꞃéıne, sun lake), the ground seems to be better; from Glendree (Ᵹleann Ꝺꞃaoı, druid's glen) and neighbouring places *Lastrea Oreopteris*, *Polypodium Phegopteris*, and both the Filmy Ferns are reported. The flora of L. Graney itself is unrecorded, although it is a considerable lake. Gort or Scarriff forms the best centre for exploring L. Graney, while Killaloe lies close to Slieve Bernagh.

Killaloe (Cıll Ꝺálua, church of St. Molua) is delightfully situated at the lower end of Lough Derg, just where the Shannon breaks away in a series of rapids from its long placid course through the Central Plain. It is a fine centre for the exploration of the lower part of that lake (see LOUGH DERG, p. 59), and for Slieve Bernagh (see paragraph above). The few plants on record from the immediate neighbourhood of Killaloe include *Myriophyllum verticillatum*, *Butomus umbellatus*, *Potamogeton densus*, *Ophrys apifera*, *Festuca Myuros;* and *Poa nemoralis* at Ballyvalley (baıle an bealaıᵹ̇, the town of the road).

THE CENTRAL CLARE LIMESTONES.

To the east and south, along a curve stretching from Corranroe (An Coꞃꞃán Ruaḋ, the red sickle (?)) to Killinaboy, the Burren hills descend rather abruptly into a wide lake-strewn limestone plain which runs through Ennis southward to the Shannon, with Coal-measure uplands on the west and Old Red Sandstone hills to the eastward beyond Crusheen (Cꞃoiꞅín, little cross) and the railway. This is a flattish lonely country; consisting of low ridges of bare grey rock, or of tilled land, with water-logged hollows occupied by mazy lakes or turloughs. These drain southward into the Fergus estuary; and that erratic stream and its tributaries flit like wraiths through the district, appearing and disappearing, and springing underground from lake to lake.

Interest centres in the wide expanses of bare limestone, which harbour a full "Burren" flora, including quantities of *Arenaria verna*, *Geranium sanguineum*, *Saxifraga hypnoides*, *Rubia peregrina*, *Galium boreale*, *G. sylvestre*, *Asperula cynanchica*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Taxus baccata*, *Juniperus nana*, *Sesleria cærulea*, *Ceterach officinarum*, &c. A few other plants common in Burren—*e.g. Dryas octopetala*, *Epipactis atro-rubens*—only here and there descend into the plain. In the NE., about Rockforest, *Potentilla fruticosa* and *Rhamnus Frangula* are abundant over a large area, and *Spiræa Filipendula*, which has its head-quarters about Gort, is widely but sparingly distributed. *Adiantum Capillus-Veneris* occurs in some abundance in two localities. *Habenaria intacta* has not yet been found in the district, but no doubt occurs. The lakes and marshes yield an interesting flora, *Cladium Mariscus*, *Carex filiformis*, *Butomus umbellatus*, *Nasturtium sylvestre*, *Potamogeton plantagineus*, *Chara polyacantha* being characteristic species. *Sium latifolium*, *Lemna polyrhiza*, *Lastrea Thelypteris*, and *Equisetum trachyodon* also occur. *Limosella aquatica* has one of its few Irish stations at Inchiquin Lake (Inꞅe Uí Ċuinn, O'Quin's island); *Rubus iricus* also grows there, and *Typha angustifolia*. A patch of *Teucrium Scordium* at Castle Lough represents the only colony of this plant beyond the shores of the Shannon. *Viola stagnina* grows by Skaghard Lough (Loċ Sᵹeaċ Áꞃd (?), the lake of high whitethorns). *Ceratophyllum demersum* and *Potamogeton nitens* are among the other rarer plants of the district.

Corofin (Coꞃa Ḟinne, weir of Finn) is the natural centre for this district, but accommodation there is very limited. The visitor will find Ennis an excellent head-quarters, with railway communication to the NW., NE., and SE.

R. Ll. Praeger: Notes on the Botany of Central Clare. *Irish Nat.*, xiv., 188–193. 1905.

LISDOONVARNA.

Lisdoonvarna (Lios Dúin ḃearna, the fort of the fortress of the gap) lies comparatively high (300 feet) on the Coal-measures, outside the SE. margin of the Burren limestones. Its bracing air and medicinal waters have given it a high local repute as a health resort; and the straggling town consists mainly of hotels. The shales produce as usual a heavy, wet soil; and treeless tracts of marshy, moory pasture and bog prevail. The streams cut down through the shales often till they reach the underlying limestone. A calcifuge upland flora prevails. Among the plants occurring are *Meconopsis cambrica*, *Drosera anglica*, *Myosotis repens*, *Pinguicula lusitanica*, *Malaxis paludosa*, *Carex pendula*, *Lastrea æmula*, *Botrychium Lunaria*, and grand masses of *Osmunda regalis*. *Pinguicula grandiflora* (plate 23) has its only station outside Cork and Kerry on a wet cliff close to the town; and *Adiantum Capillus-Veneris* occurs on a small outcrop of limestone. The complete difference of flora between the limestone and the shales can be studied nowhere better than about Lisdoonvarna.

Cliffs of Moher.—From near Lisdoonvarna a high ridge of Coal-measure shales and flag-stones runs SW., and where it strikes the coast, forms a magnificent range of cliffs, which drop 650 feet sheer into the Atlantic. This vast wall is tenanted by *Sedum Rhodiola*, and the usual maritime species. Along the summit *Viola lutea* flourishes, and *Sagina subulata*; and between Roadford and the cliffs *Polypodium Dryopteris*, so rare in Ireland, has been gathered. About Fisherstreet, at the north end of the cliffs, *Limosella aquatica* occurs. The Cliffs of Moher are within easy driving distance of Lisdoonvarna on the NE., and of Lehinch (Leiṫinse, peninsula) and Ennistymon (Inis Díomáin, Diomán's island) on the SE. At Lehinch *Viola lutea* is abundant on sand-dunes; and *Habenaria intacta* grows between there and Ennistymon; both these places are situated within the Coal-measure area, and lack the interest that pertains to the limestone country.

THE BURREN HILLS.

Looking southward from the Connemara shore across Galway Bay, the hills of Burren (boireann, a great rock—rocky district) are seen rising gaunt and bare. Although their sky-line is undulating and unbroken, the face of the hills is ruled with parallel horizontal bands, as if painted with streaks of grey of varying shades. In the general outline we see the moulding action of the Glacial Period, which rounded the hills and passed away without leaving any friendly covering of drift. The weather has had free play on the limestone rocks, so that the horizontal bedding stands boldly out on a naked and waterless surface. Burren is, indeed, the dry skeleton of a country, and deserves the description said to have been given of it by one of Cromwell's officers, who, returning from a reconnoitring expedition, reported that it was a savage land, yielding neither water enough to drown a man, nor wood enough to burn a man, nor soil enough to bury a man. However, the warm, moisture-laden atmosphere supplies in abundance the needs of plant-life; and the shelves, pockets, and deep joints of the rocks are everywhere filled with verdure. Indeed, on the level terraces that abound, the rock is often nearly buried beneath a dense, low vegetation. These hills rise from the water to over 1000 feet (Slieve Elva, Sliaḃ Eilḃe, 1109 feet), and cover an area of about 14 miles by 10 miles. Over this district bare limestone extends almost without interruption, harbouring a very remarkable flora. Plants usually rare attain here an immense profusion; and the sheets of flowers and foliage that turn the grey rock into a botanical paradise in spring and summer consist largely of *Arenaria verna*, *Geranium sanguineum*, *Rubus saxatilis*, *Dryas octopetala* (plate 4) *Saxifraga hypnoides*, *Rubia peregrina*, *Galium sylvestre*, *Asperula cynanchica*, *Arctostaphylos Uva-ursi*, *Gentiana verna* (plate 21), *Euphrasia Salisburgensis*, *Sesleria cærulea*, *Scolopendrium vulgare*, *Ceterach officinarum*.

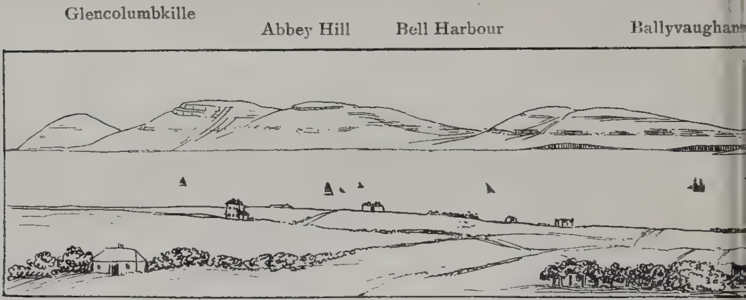


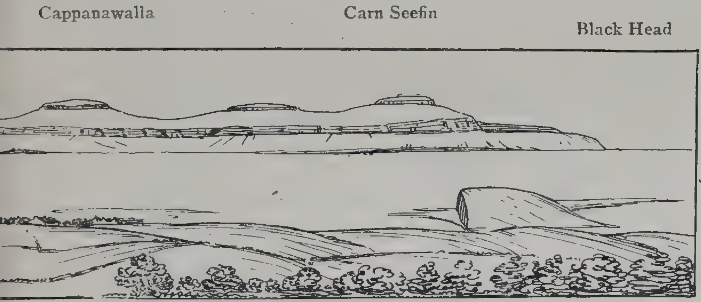
FIG. 7. The Burren Hills from t
Drawn by S. Rosamond Praeg

All of these extend down to sea-level; and many of them ascend to the tops of the hills. Other interesting ingredients of the flora, which are locally abundant or frequent, are *Helianthemum vineale*, *Spiræa Filipendula*, *Potentella fruticosa* (plate 17),

Saxifraga Sternbergii (plate 18), *Galium boreale*, *Pyrola media*, *Orobanche rubra*, *Ajuga pyramidalis* (plate 16), *Taxus baccata*, *Juniperus nana*, *Spiranthes autumnalis*, *Epipactis atro-rubens*, *Ophrys muscifera*, *Habenaria intacta* (frontispiece), *Adiantum Capillus-Veneris* (plate 27).

The commingling in these lists of northern and alpine types such as *Dryas octopetala*, *Arctostaphylos Uva-ursi*, *Euphrasia Salisburgensis*, *Ajuga pyramidalis*, with southern types, *e.g.* *Habenaria intacta*, *Adiantum Capillus-Veneris*, is a very remarkable feature.

In certain places on the lower grounds a good deal of scrub occurs, formed mainly of *Prunus spinosa*, *Cratægus Oxyacantha*, *Ilex Aquifolium*, *Euonymus europæus*, *Fraxinus excelsior*, *Corylus Avellana*; with some *Cornus sanguinea* and both species of Rhamnus. On the heights heath often prevails, with *Calluna vulgaris* and *Erica cinerea*, mixed with Arctostaphylos and Dryas. Lakes and marshes are almost absent from the district, and even streams are rare, most of the drainage being underground; but *Potamogeton lanceolatus* has one of its few British stations in the Caher River (Ɑḃainn na Caṫꞃaċ (?)), south of Black Head, and *Viola stagnina* occurs about Turlough (Ꞇoꞃlaċ, lake or pond that dries up in summer), SE. of Ballyvaughan. *Teucrium Scordium* has an outlying station beside Castle Lough, on the SE. edge of the district. *Hieracium hypochæroides* grows on cliffs in Glencolumbkille (Ᵹleann Ċoluim Ċille, Columcille's glen).



mara shore near Galway.
sketch by A. B. Wynne.

On the north and west the Burren hills look down on the sea. Eastward and south-eastward the hills drop abruptly into a plain of bare limestone, described under the headings ARDRAHAN (p. 57) and CENTRAL CLARE (p. 50). Here there is some shelter, and dense Hazel scrub is developed over considerable areas. On the cliffs of Slievecarran well-developed

Ash-Birch wood occurs (see p. 16). South-westward, a sharp contrast of vegetation results from the superposition on the limestone of Coal-measure shales, and undulating country of heavy clay, with a rank grassy and rushy vegetation and many marsh-loving plants, replaces the grey limestone terraces (see under LISDOONVARNA, p. 51). *Gentiana verna* extends sparingly to banks in the shale country, but most of the Burren plants stop abruptly on the edge of the limestone. The flora of the coast calls for no special comment. It includes *Crithmum maritimum*, *Artemisia maritima*, *Statice occidentalis*, *Convolvulus Soldanella*.

Burren can be best explored from Lisdoonvarna (p. 51) on the south, or from Ballyvaughan (*infra*) on the north.

F. J. FOOT: On the Distribution of Plants in Burren, County of Clare. *Trans. Roy. Irish Acad.*, xxiv. (Science), 143–160. Map. 1864. T. H. CORRY: Notes of a Botanical Ramble in the County of Clare, Ireland. *Proc. Belfast Nat. Hist. & Phil. Soc.*, 1879–80, 167–207.

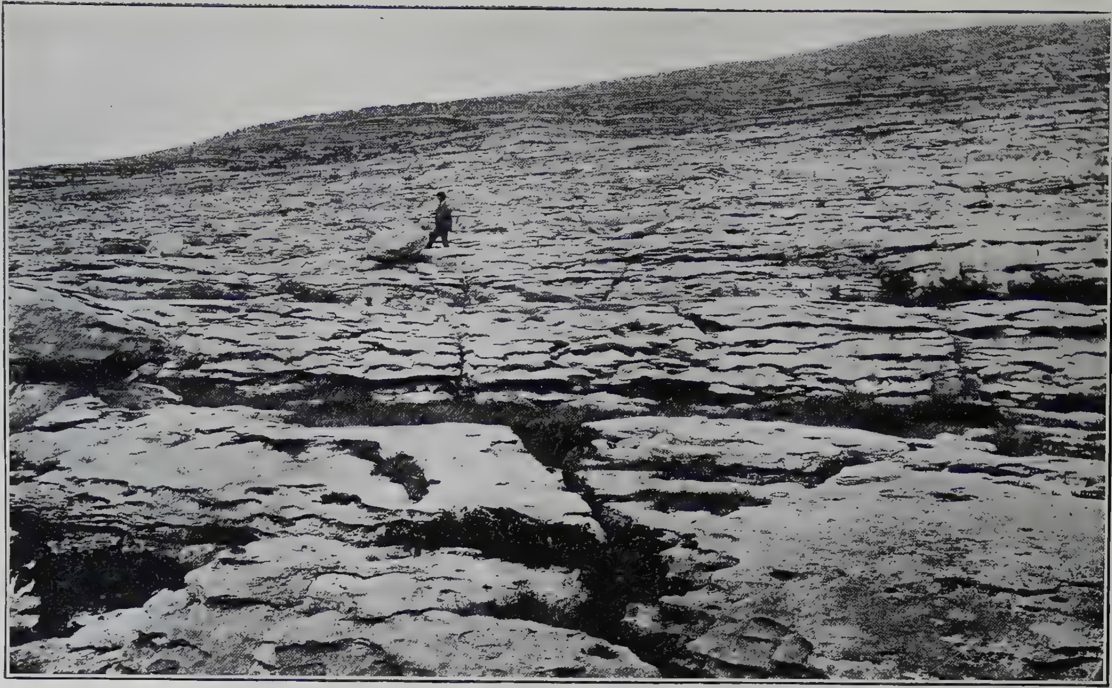
Ballyvaughan (baile Uí Ḃeaċáin, O'Behan's town).—A small village on Galway Bay, with sufficient hotel accommodation, excellently situated for the exploration of Burren. A grassy valley runs inland into the very heart of the hills, with the grey terraced limestones rising on either hand. Among the plants which grow near Ballyvaughan are *Arabis ciliata*, *Viola stagnina*, *V. lactea*, *Geranium rotundifolium*, *Potentilla fruticosa* (in quantity: see plate 17), *Galium boreale*, *Hieracium cæsium*, *Linaria Elatine*, *Orobanche rubra*, *Habenaria intacta*, *Adiantum Capillus-Veneris*, and all the more widely-spread plants of Burren, such as *Gentiana verna* and *Euphrasia Salisburgensis*. The maritime vegetation appears poor, but includes *Artemisia maritima*.

Steamer from Galway thrice a week during the summer months, or car from Ardrahan.

THE ARAN ISLANDS.

On the Aran Islands (Árainn, a kidney) the limestone pavement flora attains its most remarkable development. The islands are simply a reef of limestone stretching out from the coast of Co. Clare in a WNW. direction, dipping NNE., and broken across by the Atlantic into three parts.

The largest island, Inishmore (Inis Mór, big island), is 8½ miles long; the other two, Inishmaan (Inis Meaḋóin, middle island) and Inisheer (Inis Ṫiar, western island), much less; all are 2 to 3 miles wide. Four miles of rough water separate Inisheer from Co. Clare, and to the northward the nearest of the islands off the Connemara coast lies across a rather wider channel. The Aran Islands have been frequently



A HILLSIDE IN BURREN.

Bare weatherworn limestone. The joints and chinks are filled with luxuriant mesophile vegetation.

R. Welch, Photo.

To face p. 54.

explored botanically, on account of their exceptional interest. They are formed—save a little blown sand—of bare fissured limestone—absolutely bare until the people, carrying up sand and seaweed in baskets on their backs, began to cover the rock in sheltered hollows, and to grow little patches of potatoes and oats. Innumerable loose stone walls, enclosing fields of stone, help to break the wind. The south-western side presents a precipitous front to the ocean; the opposite shore is low. The highest point (on Inishmore) is 406 feet. Exposure is extremely great; mist and rain very frequent; frost and snow almost unknown. The rarest Irish plants occurring on Aran are *Astragalus Hypoglottis* (only Irish station), *Saxifraga Sternbergii*, *Ajuga pyramidalis*, *Calamagrostis Epigejos*. The visitor will be struck with the abundance of *Helianthemum vineale*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Adiantum Capillus-Veneris*, *Ceterach officinarum*. Other abundant species are *Arenaria verna*, *Viola hirta*, *Geranium sanguineum*, *Cornus sanguinea*, *Galium boreale*, *G. sylvestre*, *Asperula cynanchica*, *Rubia peregrina*; *Pimpinella magna*, *Spiranthes autumnalis*, *Sesleria cærulea*. Less widely distributed plants include *Matthiola sinuata* (Straw Island, not found since 1835), *Arabis ciliata*, *Crambe maritima*, *Rhamnus catharticus*, *Sagina subulata*, *Sedum Rhodiola*, *Carduus nutans*, *Hieracium anglicum*, *Cuscuta Trifolii*, *Orobanche Hederæ*, *Chenopodium rubrum*, *Allium Babingtonii*, *Juncus tenuis*, *Juniperus nana*, *Equisetum variegatum*.

Moisture-loving plants, such as the ferns, attain remarkable dimensions, Ceterach being often a foot in length, and Maidenhair two feet; these grow deep in the joints of the limestone. It will be noted that the characteristic plants present the interesting commingling of northern and southern types that is so marked a feature of the flora of western Ireland.

Curiously enough, *Habenaria intacta* is not recorded from this focus of the geographical plant-group to which it belongs.

The Aran Islands are connected with Galway by steamer service, three times a week; but a day excursion usually leaves only a very few hours for exploration. Accommodation may be obtained on all the islands, subject to previous arrangement. Aran is quite one of the most interesting spots in the British Islands, apart from its remarkable flora, on account of the wealth of pagan and early Christian remains, and of the primitive character of the life and customs of its people.

H. C. HART: A List of Plants found in the Islands of Aran, Galway Bay. Dublin: Hodges, Foster, and Co. 1875. J. E. NOWERS and JAMES G. WELLS: The Plants of the Aran Islands, Galway Bay. *Journ. Bot.*, xxx., 180–183. 1892. N. COLGAN: Notes on the Flora of the Aran Islands. *Irish Nat.*, ii., 75–78, 106–111. 1893. R. LL. PRAEGER: Notes on the Flora of Aranmore [Inishmore]. *Irish Nat.*, iv., 249–252. 1895.

SOUTH-EAST GALWAY.

This area comprises the portion of Co. Galway, about 738 square miles in extent, lying south of the Dublin-Galway line of railway. Its main features are (1) the contrast between the Limestone Plain flora and that of Slieve Aughty, a broad, low hill-mass of Old Red Sandstone (Scalp, An Sᵹealp, the passage cut through rocks, 1074 feet); (2) the peculiar flora of L. Derg on the eastern margin, and (3) the maritime strip along the western edge. In the east, where the Shannon and Suck form the boundary, we are in typical Central Plain country—flattish drift-covered limestone, with great bogs, occasional esker-ridges, and a good deal of planted timber. Going westward, bogs and wood decrease, and the limestone rock shows through the grassy covering more and more, till around the head of Galway Bay large areas consist of bare fissured rock with a full "Burren" flora (see under The Ardrahan Limestones, p. 57). As in some other places, the junction of land and sea is marked by a deposit of Boulder-clay, so that a fringe of cultivated land occupies the sea-margin. The rocky indented shores of L. Derg yield the peculiar flora of the Shannon and of the limestone lakes in full measure (see Lough Derg, p. 59); Portumna forms the best centre for their exploration (see Portumna, p. 60). Woodford, lying between Slieve Aughty and the lake, is famous as the earliest known station of *Sisyrinchium angustifolium*, which is abundant there; and it forms a good botanical centre (see Woodford, p. 59). Lakes are few; Lough Rea lies in the middle of the area, Lough Cooter in the SE. The Old Red Sandstone hills are heathery and bare (see Slieve Aughty, p. 58). The coast-line is deeply indented, with a stony shore, its most characteristic plant being *Artemisia maritima*. The sea-water is half fresh in places, owing to the submarine or intertidal discharge of the subterranean drainage of the bare limestone tracts.

Total flora, 666 species, including many rare calcicole plants from the "crags" and L. Derg, and also a considerable calcifuge element from Slieve Aughty and the bogs. The best species are *Viola stagnina*, *Vicia Orobus*, *Inula salicina*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Teucrium Scordium*, *Euphorbia hiberna*, *Epipactis atro-rubens*, *Habenaria intacta*, *Sisyrinchium angustifolium*, *Chara tomentosa*. With the exception of the Euphorbia and the Sisyrinchium, these are all plants of the limestone.

THE ARDRAHAN LIMESTONES.

This name may be given to the vast stretch of low-lying bare limestones that mainly occupy the district at the head of Galway Bay, and stretch up towards Craughwell, and down to Gort and Kinvarra and the foot of the hills of Burren. The greater part of this flat area is only from 100 to 200 feet above sea-level, and a full "Burren flora" prevails. A certain amount of drift, thrown down over the rocks, allows of patches of cultivation, mainly near the very irregular coast-line; inland of this, the grey rock often extends as far as eye can reach. Turloughs (grassy hollows which form lakes in winter) are frequent; and in a few of them the water is sufficiently permanent to merit the use of the term "lake."

The characteristic plant of this district is *Spiræa Filipendula*, which is very abundant towards the south, and is, indeed, in Ireland hardly found outside this area and its immediate neighbourhood. As one ascends from these low grounds towards the nearest of the Burren summits, this plant ceases, and others which are rare on or absent from the plain, such as *Dryas octopetala*, *Helianthemum vineale*, *Epipactis atro-rubens*, become abundant. In other respects, the flora closely conforms to that of the Burren hills; and we walk amid a profusion of *Geranium sanguineum*, *Saxifraga hypnoides*, *Galium boreale*, *G. sylvestre*, *Asperula cynanchica*, *Rubia peregrina*, *Arctostaphylos Uva-ursi*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Plantago maritima*, *Spiranthes autumnalis*, *Sesleria cærulea*, with often *Habenaria intacta* and *Ophrys muscifera*. *Lastrea Thelypteris* is present, and at Castle Taylor *Hypopithys multiflora*. Two of the rarest members of the flora occur in some frequency about Gort—namely, *Viola stagnina* and *Limosella aquatica*. The very stunted arbuscular vegetation includes *Rhamnus catharticus*, *R. Frangula*, *Cornus sanguinea*, *Juniperus nana*, and *Taxus baccata*. The most conspicuous plant of the rough stony sea-shore is *Artemisia maritima*; the maritime vegetation is poor.

The district can be visited on a one-day trip from Galway by taking train to Craughwell (Cꞃeaċṁaoıl, prey-heap (?)), Ardrahan, or Gort (Ᵹoꞃꞇ Inꞅe Ᵹuaıꞃe, the field of Guaire's island). At Ardrahan (Áꞃꝺ Raṫaın, the height of the fort), a good little hotel will be found; and accommodation sufficient for the enthusiastic botanist can also be obtained at Gort, Kinvarra (Cınn Ṁaꞃa, head of the sea), and Oranmore (Uaꞃán Móꞃ, great spring). The characteristic flora can be excellently studied at Garryland (Ᵹaꞃoıleán (?), near island (?)), close to Gort—an exceedingly interesting place.

The country round the head of Galway Bay is the area of least rainfall in the West of Ireland; and the combination of this with a light limestone soil is probably the explanation of the weed flora, unusually diversified for the west, which is found in the Kinvarra district, and on the north coast of Clare. This includes three Poppies, *Lepidium campestre* and *Linaria Elatine*.

A. G. MORE: Notes on the Flora of the neighbourhood of Castle Taylor, in the County of Galway. *Proc. Bot. Soc. Edinb.*, 1855, 26-30, 60.

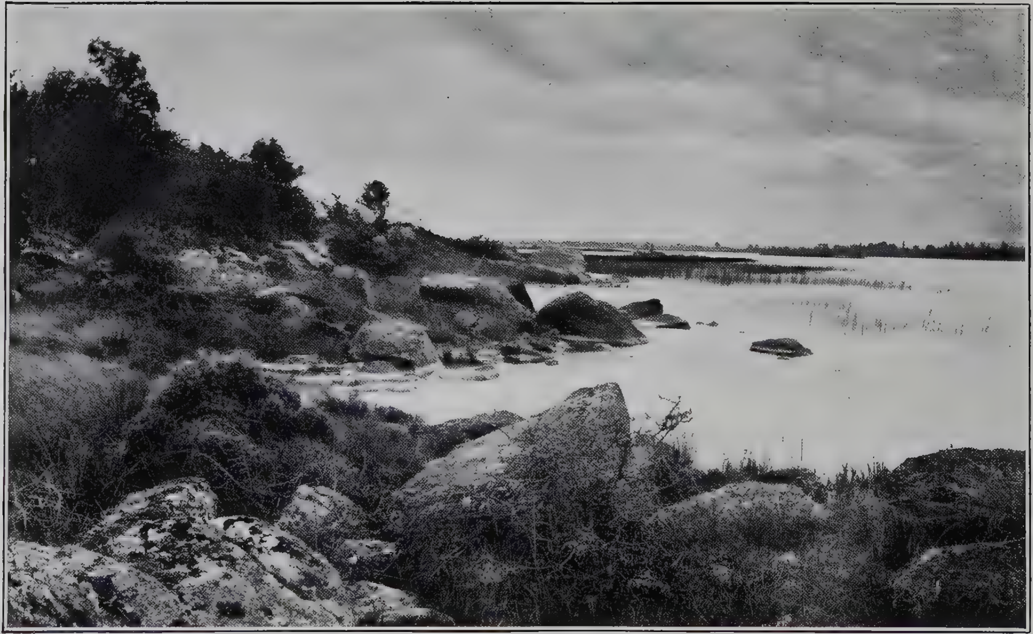
Lough Cooter, or Cutra (Loċ Cútra, the lake of Cútra), is a pretty lake, three miles in length, lying on the limestone SE. of Gort, with the Old Red Sandstone hills (see SLIEVE AUGHTY, *infra*) rising close at hand. The flora of its shores, so far as known, includes *Ophrys muscifera*, *O. apifera*, and *Epipactis palustris*. *Euphorbia hiberna*, a representative of the adjoining calcifuge flora, descends the Owendalulleegh R. almost to the lake.

SLIEVE AUGHTY.

In Co. Galway, S. of Loughrea, the ground rises in a gentle slope out of the low limestone plain till it exceeds 1200 feet, and broad, flat hills stretch thence southward over the Clare border, overlooking Scarriff Bay in L. Derg, on the E., and Crusheen on the W. These hills, known as Slieve Aughty (Sliaḃ Eaċtġa), represent an anticline, are formed of Old Red Sandstone with a core of Silurian rocks, and occupy about 250 square miles. On every side the slopes are gentle, and broad, heathery ridges, uninteresting to the botanist, form the higher grounds. A couple of lakes, of which the larger, L. Graney, is three miles in length, are embosomed in the hills. This area is not very inviting to the explorer, and the most interesting ground is the wooded glens that here and there diversify the slopes. On the west, the valley of the Owendalulleegh River (Aḃainn Dá Loilġeaċ, the river of the two milch cows) affords one of the few Connaught stations for *Euphorbia hiberna*; and on the eastern side the Dalystown woods yield a group of plants, mainly upland in character, including *Thalictrum collinum*, *Habenaria albida*, *Milium effusum*, *Festuca sylvatica*, *Equisetum hyemale*, *E. trachyodon*. Here also the rare *Lastrea remota* has its only Irish station. The district is a remote one, and but little known. Gort, Woodford, Scarriff, or Mountshannon would be the best base for the visitor.

For the southern prolongation of this hill district, about and beyond Lough Graney, see under SLIEVE BERNAGH, p. 49.

PLATE 9.



ON THE SHORE OF LOUGH DERG.

Near Woodford, S.E. Galway. Below the woodland zone (Ash and Hawthorn, with some White Beam) is a dry grassy zone, with *Rhamnus catharticus*, *Campanula rotundifolia*, *Galium boreale*, *Sesleria cærulea*, *Briza media*, &c., followed by a wet grassy zone, with *Spiræa Ulmaria*, *Lythrum Salicaria*, *Eupatorium cannabinum*, *Schænus nigricans*, &c., extending to water-level, where *Scirpus lacustris*, *Phragmites communis* and Charas are the leading plants.

To face p. 59.

WOODFORD.

The village of Woodford forms a good centre for the exploration of Slieve Aughty on the W., and Lough Derg on the E.; it lies beside a pleasant trout-stream on the junction of the Old Red Sandstone of the hills with the limestone of the plain. Woodford is famous as the first-discovered Irish station of *Sisyrinchium angustifolium*, which will be found in meadows and rough ground from the village down to the lake, and thence nearly to Portumna. The hill-region adjoining Woodford on the W. has been little explored (see SLIEVE AUGHTY, p. 58). The eastern environs of Woodford, and especially the adjacent shores of L. Derg, yield a very interesting flora, which includes *Sisyrinchium angustifolium* (plate 25), *Inula salicina* (plate 19), *Chara tomentosa*, *Thalictrum collinum*, *Prunus Padus*, *Drosera anglica*, *D. intermedia*, *Rhamnus catharticus*, *R. Frangula*, *Galium boreale*, *G. uliginosum*, *Utricularia intermedia*, *Teucrium Scordium*, *Juniperus communis*, *Ophrys apifera*, *Epipactis palustris*, *Rhynchospora fusca*, *Sesleria cærulea*, &c. (see LOUGH DERG, *infra*). North of Woodford typical Central Plain country extends. At Derryvunlam Wood (Ꝺoıꞃe ḃun Lom (?)), between Woodford and Loughrea, *Cephalanthera ensifolia* is abundant in one of its few Irish stations.

LOUGH DERG.

This great expansion of the Shannon has Tipperary (Ꞇıobꞃaıꝺ Áꞃann, the spring of Ara) for its eastern shore, and Clare and Galway for its western. In shape it preserves a sinuous, river-like form, with occasional bays of considerable size on either side, and many small islands. Lough Derg (Loċ Ꝺeıꞃᵹḋeıꞃc, the lake of the red eye) has a length of 22 miles; the average breadth is about 2 miles. The greater part of the lake occupies a flat depression in the limestone, and has low, stony shores and no great depth; but in the south it fills a remarkable gorge between the Silurian masses of Slieve Bernagh and the Arra Mountains, and the depth increases to over 100 feet. The Shannon, which for more than a hundred miles above L. Derg has pursued a placid course across the Central Plain, breaks away in rapids and low falls after leaving the lake, and dropping 97 feet in 18 miles, reaches sea-level at Limerick. Botanically, interest centres on the limestone shores and islands. *Inula salicina*, unknown elsewhere in the British Isles, has a wide distribution here (see plate 19). *Hypericum perforatum*, *Geranium sanguineum*, *Rosa spinosissima*, *Parnassia palustris*, *Viburnum Opulus*, *Galium boreale*, *Chlora perfoliata*, *Teucrium Scordium* are very abundant and characteristic. Other characteristic plants include *Rhamnus catharticus*, *Rubus cæsius*, *Eupatorium cannabinum*, *Solidago Virgaurea*, *Antennaria dioica*, *Carlina vulgaris*, *Cnicus pratensis*, *Hieracium umbellatum*, *Lysimachia vulgaris*, *Samolus Valerandi*, *Erythræa Centaurium*, *Gentiana Amarella*, *Lycopus europæus*, *Juniperus communis*, *Schœnus nigricans*, *Sesleria cærulea*, *Selaginella selaginoides*.

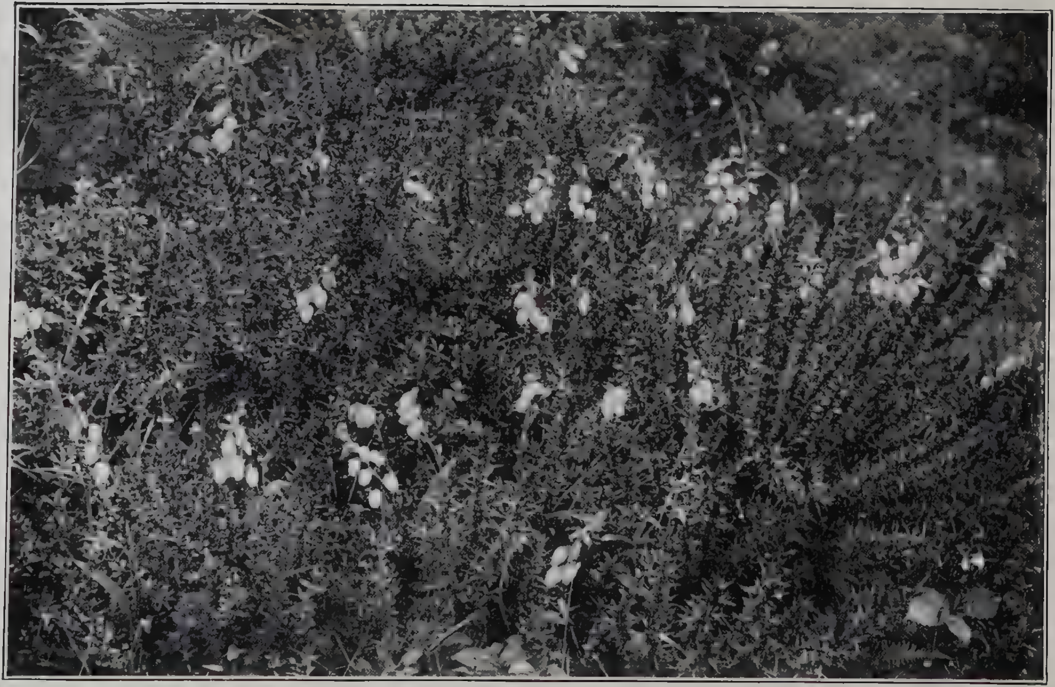
Another interesting L. Derg species is *Sisyrinchium angustifolium*, which grows in abundance in rough, damp ground about the Woodford River and northward, and has more recently been found at Scarriff (Sᵹaıɼḃ, rough stony ford), further to the south, and on the opposite Tipperary shore. The best water-plant is *Chara tomentosa*, which in the British Isles is confined to the Shannon basin. It is probably frequent; but, as the lake has not been dredged, its known stations are few. The characteristic flora of the lake-shores ceases at the edge of the limestone, and so far none of the rarer plants have been recorded from the Silurian rocks that prevail around the southern third of the lake.

While the heather-clad hills rising over Lough Derg impart to its southern portion a picturesqueness of a high order, the lover of the beautiful will possibly even prefer the northern part of the lake, where there is a noble breadth and expanse in the scenery that is impressive and exhilarating. Tourist steamers, running on the lake in summer, allow the visitor to explore its whole length. Killaloe, at the southern end, is perhaps the most comfortable centre (see KILLALOE, p. 49); but hotels will also be found at Portumna (see PORTUMNA, *infra*) at the northern end, Mountshannon, Scarriff, and Woodford on the western shore, and Nenagh (Ɑonaċ Uɼṁuṁan, the assembly-place of Ormond) near the eastern.

N. COLGAN: On the Flora of the Shores of Lough Derg. *Irish Nat.*, vi., 189–197. 1897.

Portumna.—Portumna (Poɼτ Omna, the landing-place of the oak) lies on the Shannon, where the river widens out suddenly into the great expanse of L. Derg. and it forms a good base for the exploration of the northern part of the lake, having sufficient hotel and boat accommodation, and a service of steamers up the river and down the lake. The low river-banks east of the town yield *Ranunculus Lingua*, *Lathyrus palustris*, *Sium latifolium*, *Galium uliginosum*, *Hydrocharis Morsus-ranæ*, *Sagittaria sagittifolia*, &c. On the lake-shore and islets south of Portumna may be gathered *Inula salicina*, *Vicia Orobus*, *Rosa sepium*, *Teucrium Scordium*, *Lastrea Thelypteris*, *Chara tomentosa*, and to the SW. *Sisyrinchium angustifolium;* not to mention the

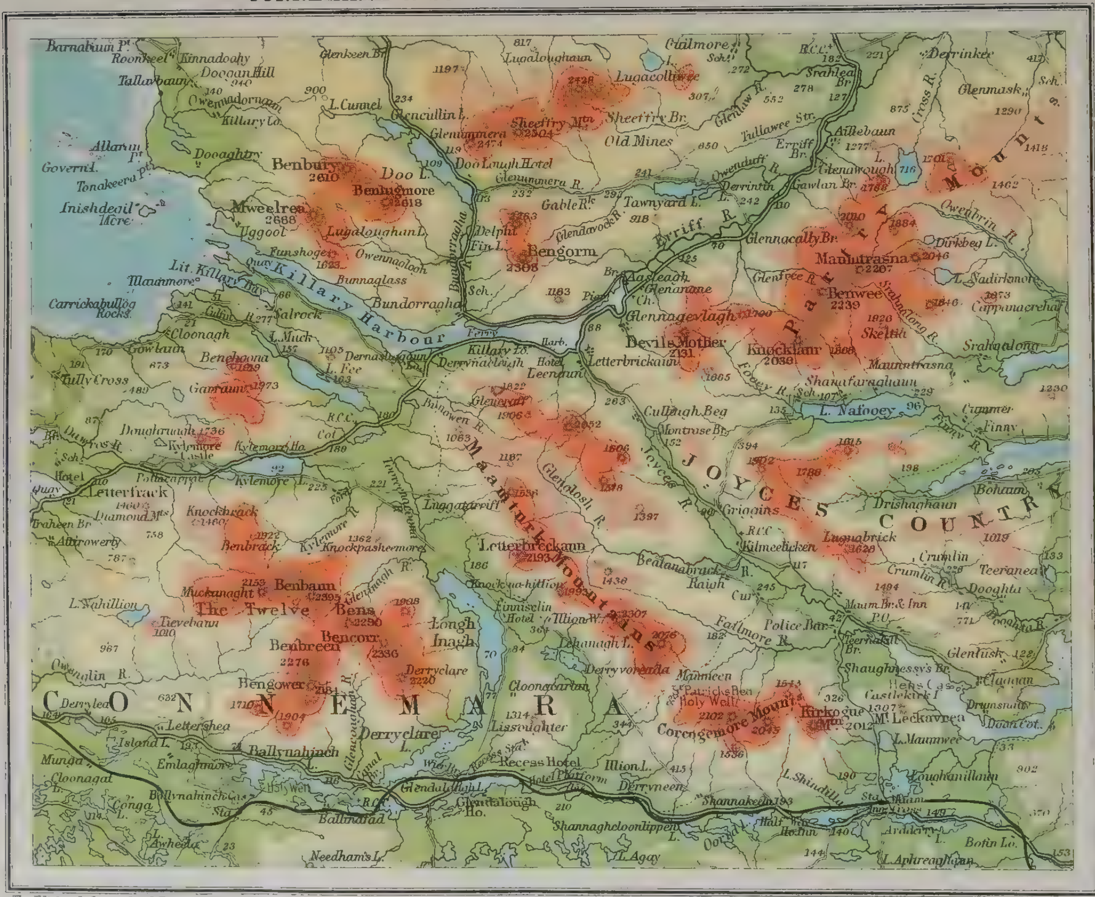
Plate 10.



Dabeocia polifolia at Roundstone, Connemara.

Growing through *Ulex Gallii*, among Brambles, Bracken, and the commoner Heaths.

CONNEMARA & SOUTH MAYO MOUNTAIN DISTRICT



The Edinburgh Geographical Institute

J.G.Bartholomew.

English Miles
0 1 2 3 4 5 6

other characteristic members of the L. Derg flora (see under Lough Derg, p. 59).

Athenry (baile Áṫa an Ríoġ, the town of the ford of the king), an important railway junction, is a small and poor town with a historic past, of which one is still reminded by imposing ruins. The botanist can spend a profitable time here. A fine esker-ridge passes close to the town on the north side. *Gentiana verna*, *Ophrys muscifera*, and *Juniperus nana* in abundance, as well as other species characteristic of the western limestone area, grow there. A few miles N. and NW., crag country occurs about Castle Lambert and elsewhere, yielding *Vicia Orobus* in several stations, *Dryas octopetala*, *Arctostaphylos Uva-ursi*, *Gentiana verna*, *Euphrasia Salisburgensis*, &c. To the southward, about Moyode (Maġ Ḟóiḋ, sod plain), is more crag land, with *Viola stagnina*, *Habenaria intacta*, and other characteristic species.

WEST GALWAY.

Galway west of Lough Corrib, otherwise Connemara (Conṁaicne Mara, the race of Conmhac by the sea), forms one of the most beautiful and interesting districts to be found in Ireland. Botanically it consists of two widely different areas, of which the dividing line is the road from Galway to Oughterard—on the east, a strip of bare limestones fringing L. Corrib; on the west, between 700 and 800 square miles of volcanic and metamorphic rocks, a region of wild bogs, mountains, and lakes, with a low, rocky coast-line forming a maze of bays, creeks, and islands. The limestone area (which includes a patch at Clonbur, at the north end of L. Corrib) harbours a flora of "Burren" type, though here already there is a thinning out of the number of characteristic species (see The Moycullen Limestones, p. 62, and Lough Corrib, p. 63). Crossing the Galway-Clifden road, we pass abruptly from the calcicole group to the full calcifuge flora of Connemara, with *Dabeocia polifolia* nodding its great purple bells at us from the wayside banks (see plate 10), and *Saxifraga umbrosa* clinging to the rocks (see plate 5). The southern half of Connemara—south of the road and railway from Oughterard to Clifden—is low (most of it under 250 feet), with great areas of trackless bog-land, starred with innumerable lakelets full of *Lobelia Dortmanna* and *Eriocaulon septangulare* (see plate 6). Here *Erica Mackaii* (plate 20) has its only home in the British Isles; and *E. mediterranea* its original Irish station. North of the road and railway, the ground rises abruptly into naked quartzite highlands (see MAAM TURK, p. 66, and THE TWELVE BENS, p. 65), which yield many interesting plants; and other mountains stretch on northward to the Mayo boundary. A semicircle of beautiful lakes sweeps round the base of the Twelve Bens, and this area, with Recess and Ballynahinch as centre (see RECESS, p. 66), must be looked on as the focus of Connemara from the tourist point of view.

In addition to the species already mentioned, many uncommon plants abound in this region, especially bog species. *Osmunda regalis* is everywhere; *Drosera anglica* and *D. intermedia* are as common as *D. rotundifolia*, and *Utricularia intermedia* as *U. minor*; the pools are fringed with *Cladium Mariscus*, *Carex filiformis*, *C. limosa*. Dry knolls are wreathed with *Arctostaphylos Uva-ursi*. *Rubus iricus* and *R. myricæ* var. *hesperius* are characteristic brambles. One of the most interesting plants is *Potamogeton Kirkii*, which is found in the river at Maam and in L. Corrib.

Flora, 701 species. The leading feature is of course the occurrence of the Lusitanian and American type plants referred to above. The strip of limestone along L. Corrib adds a large calcicole element to the flora. Of rare plants additional to those named above may be mentioned *Ranunculus scoticus*, *Arabis ciliata*, *Helianthemum guttatum*, *H. vineale*, *Vicia Orobus*, *Potentilla fruticosa*, *Hieracium argenteum*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Orobanche rubra*, *Ajuga pyramidalis*, *Epipactis atrorubens*, *Habenaria intacta*, *Naias flexilis*, *Carex trinervis*, *Calamagrostis Epigejos*, *Deschampsia discolor*, *Adiantum Capillus-Veneris*, *Lycopodium inundatum*. Three plants—namely, *Erica Mackaii*, *Carex trinervis*, *Deschampsia discolor*—are in Ireland confined to this division; and the first of these is unknown in Great Britain, as are several other of the most striking members of the flora.

THE MOYCULLEN LIMESTONES.

Moycullen (Maġ Cuilinn, the plain of holly), on the road and railway half way between Galway and Oughterard, is in the centre of the very interesting strip of limestone that stretches along Lough Corrib between the two places named. In the village street one is on the metamorphic rocks of Connemara, looking down on the low-lying limestone country, which consists of poor tillage and pasture, with ridges and great flat stretches of bare crags, limestone terraces clothed with dense Hazel-scrub, esker-like mounds, and large desolate tracts of bog, extending away to L. Corrib. Ballycuirke Lough (baile

Uí Ċuirc, O'Quirke's townland), close by the village, lies on the junction of the two formations, and offers a delightful contrast of vegetation, the western shore being heathery, with *Dabeocia polifolia*; the eastern grassy, with *Habenaria intacta*, the result of the abrupt change of rock. The limestones in this neighbourhood yield *Habenaria intacta*, *Gentiana verna*, *Dryas octopetala*, *Euphrasia Salisburgensis*, *Arctostaphylos Uva-ursi*, *Ophrys muscifera*, *Geranium sanguineum*, *Galium boreale*, *G. sylvestre*, *Asperula cynanchica*, *Juniperus nana*, *Sesleria cærulea*. With them *Erica cinerea* grows abundantly on the bare limestone. *Pimpinella magna* and *Verbena officinalis* are plentiful on roadsides. *Epipactis palustris* and *Potamogeton nitens* are found at Ross Lake.

LOUGH CORRIB.

This great lake lies on the western edge of the Limestone Plain. In its southern portion the limestone still prevails on its western shore for a mile or two; but in its northern part the metamorphic hills rise direct from the water. In shape L. Corrib (Coirib, anciently Loċ Oirbsean, Oirbsen's lake) is irregular, with a NW. and SE. trend, and a length of 27 miles. Galway City lies close to its low-shored and shallow southern end; Oughterard is situated half-way along its western bank; and its western termination is buried far away among the Connemara hills. Fretted limestone shores, backed by bogs and extensive grey pavements, fringe the lake; except in the north-west, from Oughterard to Cong, where the metamorphic rocks bring in a bolder and highly picturesque type of scenery. The flora of the limestone will be found referred to under the heading MOYCULLEN LIMESTONES (p. 62); and of the metamorphic rocks, under OUGHTERARD (p. 64). *Ranunculus scoticus* is plentiful at the narrow middle part of the lake (Kilbeg), and is probably widespread. The marshes on the edge of the lake are full of *Juncus obtusiflorus*, *Cladium Mariscus*, *Schœnus nigricans*, *Epipactis palustris*. In hydrophytes the waters of the lake are not particularly rich. *Chara polyacantha* is common. *Lobelia Dortmanna* and *Eriocaulon septangulare* occur in the NW., and *Potamogeton Zizii*. *Potentilla fruticosa*, recorded long ago from the lake-shore below Oughterard, has not been recently found. The numerous islands have never been systematically explored. From Bilberry I., one of the many limestone knolls off Oughterard, *Vicia Orobus* and *Taxus baccata* are recorded. Cannaver I. (Ceann a' ḃairr (?)—miscalled Canova), at the entrance of the NW. arm of the lake, and inside the metamorphic area, yields *Thalictrum collinum*, *Rhamnus catharticus*, *Galium boreale*, *Hiera-*

cium umbellatum, *Dabeocia polifolia*, *Lastrea æmula*. The botanist visiting Lough Corrib has an interesting problem before him in the rediscovery of *Potamogeton Babingtonii*, which is known only from a single specimen found floating in the lake by John Ball in 1835, and of *P. Kirkii*, apparently gathered there by Dr. Moore in 1853.[1]

Oughterard is the best centre for the exploration of L. Corrib by water: on account of the fishing, plenty of boats are obtainable there. At Galway, and at Cong (small hotels), one has the advantage of a daily steamer running the length of the lake. The steamer calls at Kilbeg ferry (Cıll ḃeaᵹ (?), little church (?)), situated on the narrow waist of the lake; this is a strategic centre for the explorer, and modest accommodation may be obtained.

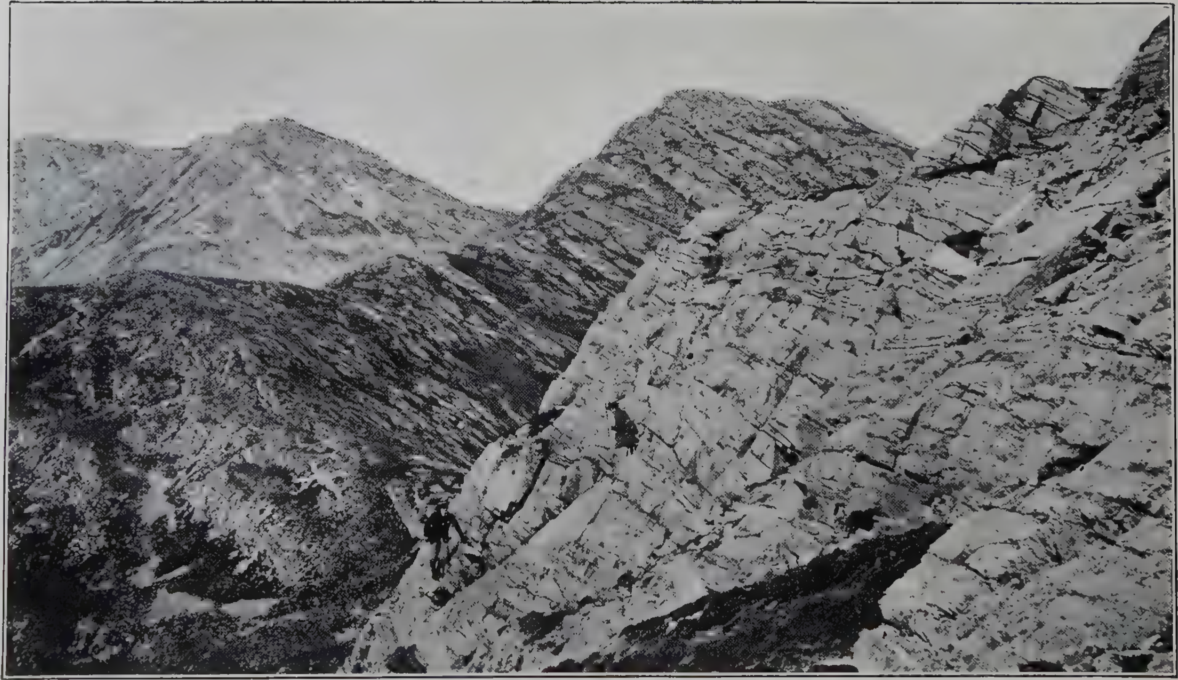
OUGHTERARD.

Oughterard (Uaċꞇaɼ-áɼꝺ, high upper land) forms an interesting centre for the botanist, inasmuch as, like Galway and Moycullen, it lies upon the junction of the Carboniferous limestone with the metamorphic and igneous rocks of West Connaught—of the flat grey limestone pavements with the wilderness of bog, lake, and mountain that characterizes Connemara. The proximity of Lough Corrib provides an additional attraction (see LOUGH CORRIB, p. 63). The limestone extends SE. from Oughterard towards Galway, between the railway and the lake. Grey stretches of bare terraced crags alternate with great peat bogs. Its plants include *Potentilla fruticosa* (shore of L. Corrib below Lemonfield, not found recently), abundance of *Gentiana verna*, *Euphrasia Salisburgensis* and the commoner crag species, and more sparingly *Habenaria intacta* and *Ophrys muscifera* (see THE MOYCULLEN LIMESTONES, p. 62). North, west, and south the change of rock is shown by the heathery ridges that lie around the village, on which we at once find a typical Connemara flora, with *Saxifraga umbrosa*, *Dabeocia polifolia*, on bogs *Rhynchospora fusca*, and in the pools *Eriocaulon septangulare*, *Utricularia intermedia*, *Lobelia Dortmanna*, and everywhere *Osmunda regalis*. The tourist will find the limestone flora very well developed around Ross Lake and Ballycuirke Lake (see p. 62), while for the opposite aspect of the flora, the beautiful walk along the north-western arm of Lough Corrib can be confidently recommended. *Rubus iricus* and *R. myricæ* var. *hesperius*, two characteristic western brambles, are abundant about Oughterard.

---

[1] See *Irish Nat.*, xviii., 83–85. 1909.

PLATE II.



AMONG THE TWELVE BENS, CONNEMARA.

R, Welch, Photo.

To face p. 65.

THE TWELVE BENS.

The beautiful Twelve Bens (corrupted into Twelve Pins) or Bennabeola (beanna beola, the peaks of Beola) and the adjoining mountains of Maam Turk consist of two great masses of quartzite flanked with schists, and separated by a low bog-filled valley with lakes. So many of the summits range a little over 2000 feet that the whole suggests the wreck of an old plain of denudation. The Twelve Bens occupy an approximately circular area in western Connemara, stretching from Ballynahinch to Kylemore, and fringed on the S. and E. with a chain of lovely island-studded lakes. The mountain-sides are steep, and to a great extent devoid of any covering of peat or vegetation; and much of the ground is sufficiently precipitous to give the climber ample scope for the enjoyment of his hobby. Some of the valleys are filled with deep, rough bog, and the ridges give better walking. The Twelve Bens form a compact and very beautiful mountain-group, with rugged quartzite points everywhere standing up against the sky. Towards the west, mica schist comes in, and forms a more hospitable substratum for alpine plants than is furnished by the quartzite.

The vegetation in general is sparse and stunted; its most interesting features are the occurrence of some of the well-known lowland plants of Connemara, which creep up into the high grounds—such as *Dabeocia polifolia*—and the comparative richness of the alpine flora which, especially on one or two mica-schist peaks, attains a development seldom met with on Irish mountains. Of the plants which occur on the high grounds the following may be mentioned:—*Thalictrum alpinum*, *Meconopsis cambrica*, *Silene maritima*, *Sagina subulata*, *Rubus saxatilis*, *Saxifraga oppositifolia*, *S. grœnlandica*, *S. stellaris*, *S. umbrosa*, *Sedum Rhodiola*, *Saussurea alpina*, *Crepis paludosa*, *Hieracium anglicum*, *H. vulgatum*, *H. argenteum*, *Arctostaphylos Uva-ursi*, *Dabeocia polifolia*, *Armeria maritima*, *Oxyria digyna*, *Salix herbacea*, *Juniperus nana*, *Carex rigida*, *Hymenophyllum unilaterale*, *Asplenium viride*, *Cystopteris fragilis*, *Polystichum Lonchitis*, *Lastrea æmula*, *Lycopodium alpinum*.

The best ground for alpine plants is Muckanaght (Mucanaċt, (?)) in the middle of the group. Ben Lettery (beann Leitiriġ, peak of the wet hillside), which overlooks Ballynahinch Lake and the Galway-Clifden railway and road, also yields a good many interesting plants, and is much more easy of access.

The area of which the Twelve Bens form the centre is a famous tourist district, and well supplied with hotels, as at

Recess in the south, Clifden (Ɑn Cloċán, the beehive-shaped house) and Letterfrack (Leiꞇiꞃ Fꞃaiᵹ, women's (?) wet hillside) in the west, and in the north, rather further removed from the mountain-group, at Leenane and Renvyle.

H. C. Hart: Report on the Flora of the Mayo and Galway Mountains. *Proc. Roy. Irish Acad.*, 2nd Ser., iii. (Science), 736-744. 1883. N. Colgan: Botanical Notes on the Galway and Mayo Highlands. *Irish Nat.*, ix., 111-114. 1900.

RECESS.

Recess, where the railway company has built a fine tourist hotel, and where more modest accommodation also may be obtained, is extremely well situated for the exploration of the mountains that rise to E. and W. (see The Twelve Bens, p. 65, and Maam Turk, *infra*). It lies in a sheltered nook, with lake and rocky moor on every side. Lisoughter (Lioꞅ Uaċꞇaiꞃ, upper fort), the isolated hill rising close to Recess, yields, in addition to "Connemara marble" (serpentine), *Dryas octopetala*, *Saxifraga oppositifolia*, *Asplenium viride*, *Juniperus nana*, *Hieracium anglicum*, *H. iricum*, and of course *Saxifraga umbrosa*, *Dabeocia polifolia*, &c. Beautiful lakes abound: Glendalough L. (Ᵹleann Ḋá Loċ, the glen of the two lakes) lying close by, while Ballynahinch L. (Baile na hInꞅe, town of the island), Derryclare L. (Ḋoiꞃe an Ċláiꞃ, the oakwood of the plain), and L. Inagh (Loċ Eiḋneaċ, ivy lake), sweep in a semicircle round the base of the Twelve Bens. These lakes yield *Subularia aquatica*, *Pilularia globulifera*, plenty of *Eriocaulon septangulare*, and *Lobelia Dortmanna*. The bogs are full of the characteristic Connemara species (see under West Galway, p. 61). *Erica Mackaii*, *E. mediterranea*, and *Naias flexilis* lie within a day's excursion in the Roundstone direction (see Roundstone, p. 69).

MAAM TURK.

The Maam Turk mountains (Máḋm Ꞇoꞃc, wild boars' mountain-pass) form a well-defined ridge of quartzite stretching SE. and then E., for a distance of about 20 miles from the Killery to the NW. corner of L. Corrib near Maam. On the western side they rise very boldly like "a zigzag series of beehives" from the valley which separates them from the Twelve Bens—a series of rounded, massive, bare quartzite knobs. As H. C. Hart has concisely said, the Maam Turk range is the tangled cluster of the Twelve Bens stretched out in a curved line with their tops rubbed off. For climbing and botanizing they are neither so picturesque nor so interesting as the neighbouring range. The northern end of the ridge is formed of Silurian slates, but does not ascend high enough to allow this more hospitable rock to influence the alpine vegetation. The highest point of the range rises to 2307 feet; but the best ground for the botanist is Maumeen (Máimín, little mountain pass, little *nek*), more to the SE., and not far from Recess. As in the case of the Twelve Bens, there is an absence of tarns at high levels, although innumerable lakes fringe the base of the hills.

The rarer plants recorded from the higher grounds of Maam Turk are:—*Thalictrum alpinum*, *Sagina subulata*, *Saxifraga oppositifolia*, *S. stellaris*, *S. umbrosa*, *Sedum Rhodiola*, *Hieracium argenteum*, *H. iricum*, *Lobelia Dortmanna*, *Dabeocia polifolia*, *Salix herbacea*, *Juniperus nana*, *Eriocaulon septangulare*, *Lycopodium alpinum*; and most of the other characteristic plants of Connemara occur about the hills.

H. C. HART: Report on the Flora of the Mayo and Galway Mountains. *Proc. Roy. Irish Acad.*, 2nd ser., iii. (Science), 732–735. 1883.

Maam.—The village (if it may be dignified by this name) of Maam (Máḋm, mountain pass, *nek*) lies in the fine mountain valley which descends to the NW. arm of L. Corrib—a lonely and picturesque spot. Hither come botanical pilgrims to see *Potamogeton Kirkii* in its well-known habitat. It grows in the Bealanabrack river near the bridge, close by which is the little hotel. Along the banks *Carex aquatilis* may be gathered, with abundance of three characteristic western Brambles—*Rubus iricus*, *R. myricæ* var. *hesperius*, and *R. Borreri*. *Lycopodium inundatum* has one of its few Irish stations on wet heath on the west side of Maam; and *Hieracium iricum* is recorded. The Maam valley is reached by a picturesque mountain road from Maam Cross station on the Galway-Clifden line of railway. Its western side is formed by the imposing quartzite ridge of Maam Turk (see last paragraph). On the eastern side grassy Silurian hills rise to 1500–2000 feet, over which one crosses to the beautiful Lough Nafooey and the "Narrow Lake" on Lough Mask.

KYLEMORE AND BENCHOONA.

Stretching north from the Twelve Bens to the Killary fiord, and cut off from the former by the beautiful pass of Kylemore (An Ċoill Ṁór, the great wood), with its lakes and woods, a group of hills rises, of which Benchoona (Beann Ċúinne (?)

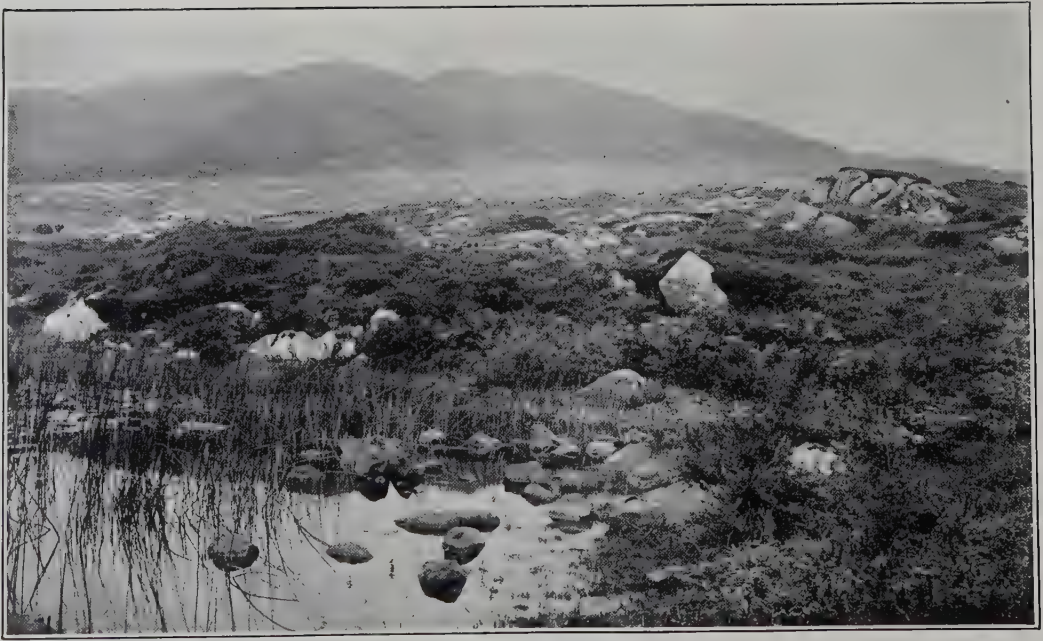
peak of the corner (?), 1975 feet) is the highest point. Several picturesque shoulders extend from the central mass; and a number of lakes lie among the hills. At the higher levels *Thalictrum alpinum*, *Saxifraga oppositifolia*, *Sagina subulata*, *Salix herbacea*, *Isoetes lacustris* occur. *Erica mediterranea* grows not infrequently in this area. *Rubia peregrina* is found at Salruck on the Killery—a delightful spot well worth a visit. The lakes yield *Lobelia Dortmanna*, *Eriocaulon septangulare*, &c., as usual. The steep scarp behind Kylemore Castle is clothed with native scrub (probably the remains of the "great wood" from which Kylemore takes its name), which deserves study.

SOUTH-WESTERN CONNEMARA.

The district lying between Clifden (An Cloċán, the bee-hive-shaped house), Roundstone, and Slyne Head (Ceann Léime, the head of the leap), possesses high botanical interest, and differs in some important respects from the rest of Connemara. Stretching from the back of Urrisbeg, the dark serrated hill which rises behind Roundstone, a maze of lakelets and rocky heath extends westward to Clifden; while along the shore limy sands, formed mainly of foraminifera and nullipores, have been widely scattered by westerly gales; and the coastal region harbours a calcicole vegetation very different from the bog and lake flora of the interior.

The flora of the great bogland which extends from Roundstone to the western ocean includes quantities of *Dabeocia polifolia*, *Drosera anglica*, *D. intermedia*, *Arctostaphylos Uva-ursi*, *Rhynchospora fusca*, *Deschampsia discolor*; the lake margins are fringed with *Cladium Mariscus*, *Carex filiformis*, *C. limosa*, and their bottoms covered with *Lobelia Dortmanna*, *Utricularia intermedia*, *Eriocaulon septangulare*, *Littorella lacustris*, but very few other plants.

The calcicole flora referred to is best developed at Dog's Bay near Roundstone, and over an extensive tract of sandy and rocky grassy pasture in the Slyne Head district, and resembles (in a reduced form) that which characterizes the limestone pavements. The most interesting plant is *Habenaria intacta*, which grows very sparingly at both ends of Dog's Bay, and more frequently on the Bunowen peninsula (Bun Aḃann, mouth of river), beyond Ballyconneely (Baile Uí Ċonġaile, O'Conneely's townland), where it has been observed in three stations. *Euphrasia Salisburgensis* (plate 22) is abundant both at Dog's Bay (a corruption of Port na fedog, Port na Feadóige, the plover's stream) and in the Ballyconneely and Bunowen district, accompanied by



CREGDUFF LOUGH AND URRISBEG, CONNEMARA.

In the deeper water *Naias flexilis*, *Scirpus lacustris*, *Nymphæa alba*. Round the margin a fringe of *Eriocaulon septangulare*, *Lobelia Dortmanna*, *Littorella lacustris*, *Mentha hirsuta*. At flood-level a fringe of *Osmunda regalis*, and above *Dabeocia polifolia* and the commoner heaths, *Juniperus nana*, *Ulex Gallii*. July, 1908.

R. Welch, Photo.

To face p. 69.

much *Asperula cynanchica*, *Centaurea Scabiosa*, *Carlina vulgaris*, *Chlora perfoliata*, *Spiranthes autumnalis*, *Orchis pyramidalis*, *Sesleria cærulea*, and by *Arabis ciliata*. The lakes of this district have likewise a flora different from that of the bogland, more calcicole and slightly halophile in character. Lobelia and Eriocaulon are rare; and instead we get quantities of Charas (*C. polyacantha*, *C. hispida*, *C. fragilis*) and Pondweeds (*P. plantagineus*, *P. nitens*, *P. Zizii*), *Ranunculus Baudotii*, *Œnanthe Lachenalii*.

The sand-surrounded marshes yield *Sium angustifolium*, *Œnanthe Lachenalii*, *Rumex Hydrolapathum*, *Epipactis palustris*, *Carex teretiuscula*—like the other plant-groups, a series quite at variance with the typical Connemara flora.

At Clifden and Roundstone hotels will be found from which the botanist can visit all parts of this region.

Roundstone itself, apart from this interesting calcicole outlier-flora (see above, p. 68), is an excellent botanical centre. This neighbourhood is the only home in the British Isles of *Erica Mackaii*, which has its head-quarters at Craigga More Lough (Loċ na Creige Móire (?), the lake of the great rock), four miles NNW. of Roundstone (plate 20). Another famous Roundstone plant is *Naias flexilis*, which grows in Cregduff Lough (Loċ na Creige Duiḃe, the lake of the black rocky land) one mile SW. of the village, accompanied by *Elatine hexandra*, &c. *Erica mediterranea* also occurs, occupying a wet, boggy valley on the NW. slope of Urrisbeg (Iorras Beag, little promontory). This hill yields in addition *Sagina subulata*, *Juniperus nana*, *Eriophorum latifolium*. *Allium Babingtonii* and *Carex trinervis* are also Roundstone plants. Several little hotels offer accommodation to the visitor.

R. Ll. Praeger: Notes of a Western Ramble. *Irish Nat.*, xv., 257–266. 1906; and Recent Extensions of the range of some rare Western Plants. *Ibid.*, xvi., 241–243. 1907.

Renvyle (Rinn a' Ṁaoil, the point of the bare promontory) is a beautiful spot situated on the north shore of Connemara, in the extreme NW. of the district. *Arabis ciliata* was first recorded from sandhills near by. The neighbourhood is not rich botanically, and is rather far removed to be a convenient centre for the Twelve Bens, &c.; but the Killery fiord and Kylemore are within striking distance (see Kylemore and Benchoona, p. 67); and boat excursions may be made to Inishbofin (p. 70) and Inishturk (p. 90), which see.

INISHBOFIN.

Inishbofin (Inis Bó Finne, the island of the white cow) lies off the Connemara coast, to the southward of Inishturk, 5½ miles from the nearest point of the mainland. Close by is the smaller island of Inishark (Inis Airc, island of famine (?)). The two may be conveniently classed together. Their combined area is 4½ square miles; and over the whole, Silurian slates prevail. The highest point is 292 feet. The greater part of the surface consists of undulating, hilly moorland, but there is a fair extent of cultivated land with potatoes, oats, barley, rye, &c., and of pasture. Four small lakes occur, and a few pools. The shores are almost everywhere cliffy, with *Crithmum maritimum* and *Spergularia rupestris*; but there is sand at the east end of Bofin yielding *Cakile maritima*, *Raphanus maritimus*, *Centaurea Scabiosa*. Arbuscular vegetation is at a minimum, but is represented by *Populus tremula*, *Prunus spinosa*, and a few Brambles, Willows, &c. The lake flora is more interesting, and includes *Ranunculus Baudotii*, *Elatine hexandra* (common), *Lobelia Dortmanna*, *Sparganium affine*, *Eriocaulon septangulare*, *Isoetes echinospora*. On the heaths *Helianthemum guttatum*, one of the rarest of Irish plants, is abundant, both on Bofin and Shark; a very handsome, large-flowered variety (*speciosa*, More) of *Campanula rotundifolia* is known only from this island; *Sagina subulata*, *Radiola linoides*, *Saxifraga umbrosa*, *Centunculus minimus*, *Empetrum nigrum*, *Juniperus nana*, *Lastrea æmula* may also be mentioned. *Calamagrostis Epigejos*, very rare in Ireland, grows among rocks at the east end of the inner harbour. *Osmunda regalis* is frequent in peaty places. *Allium Babingtonii* is the most interesting of the non-native plants. There is a little hotel on the island. Cleggan (Cloigeann, a skull), north of Clifden, is the usual point of embarkation.

A. G. MORE: Report on the Flora of Inish-Bofin, Galway. *Proc. Roy. Irish Acad.* (ser. 2), ii., 553–578. 1876.

NORTH-EAST GALWAY.

One of the least-explored portions of the whole West of Ireland. It is defined as lying E. of L. Corrib, and N. of the Galway-Ballinasloe line of railway, and consists of 840 miles of almost unbroken, flattish, featureless limestone country, with the usual large proportion of grass-land (nearly three-fifths) and of bog (one-eighth), with a good deal of cropped land (about one-sixth) and a fair amount of planted timber. Near Lough Corrib, which forms the whole W. boundary, there is a good deal of bare crag-land, with its characteristic flora. Esker-ridges here and there break up the otherwise distant sky-line; the limestone rises in a couple of spots near Tuam to over 500 feet, forming hills which are land-marks over a wide area; and the Old Red Sandstone, protruding through the limestone crust in the E. and N., provides a couple of patches of calcifuge plants. The Clare-Galway River and the Suck, both now little more than artificial drains, carry off most of the surface-water. What few lakes exist are mostly very shallow, and liable to flooding and to drying up.

Flora, 631 species. The chief interest centres in the calcicole group, which peoples the limestone crags, as the following list of rarer plants will show:—*Ranunculus scoticus*, *Vicia Orobus*, *Potentilla fruticosa*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Epipactis atro-rubens*, *Habenaria intacta*, *Potamogeton lanceolatus*, *Eriocaulon septangulare*, *Adiantum Capillus-Veneris*, *Chara canescens*, *Nitella tenuissima*.

GALWAY CITY.

Galway (Gailliṁ) is situated at the mouth of the River Corrib, where it drops suddenly to sea-level, and on the junction of the limestone with the metamorphic series. To the E. and N. are limestone pavements and grass-lands; to the W., granites, covered with bog and heath. The sharply contrasting floras of these two areas may be studied close around the city. On the limestones we find *Habenaria intacta*, growing amid abundance of *Geranium sanguineum*, *Rubia peregrina*, *Galium boreale*, *Asperula cynanchica*, *Chlora perfoliata*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Spiranthes autumnalis*, *Sesleria cærulea*. *Adiantum Capillus-Veneris* has also been found. The limestone flora is very well developed about **Menlo**, where, in addition to the foregoing, *Hieracium lasiophyllum*, *Allium Babingtonii*, and *Lemna polyrhiza* may be seen. On the W., on the other hand, stony heath prevails. *Dabeocia polifolia* may be gathered, and with it such plants as *Saxifraga umbrosa*, the three Sundews, the Bladderworts, &c. **Gentian Hill**, on the coast 3 miles west of Galway, is a promontory of limestone drift, colonized by an interesting outlier of the limestone flora, including *Gentiana verna*, *Dryas octopetala*, *Juniperus nana*, *Sesleria cærulea*. *Zostera nana* grows in the mud on the east side of the promontory, and *Crambe maritima* sparingly on the shore. Barna Head (bearna, a gap), beyond Gentian Hill, is a similar promontory with a similar flora; *Artemisia maritima* also has been found there. A little west of Salthill *Helianthemum vineale* has its only Galway station.

The gravelly shore east of Galway yields, among other plants, *Raphanus maritimus*, *Glaucium flavum*, *Dipsacus sylvestris*, *Solanum nigrum*, *Hyoscyamus niger*, *Chenopodium rubrum*, *Chara canescens*. About the city itself colonists are frequent, and the roadside flora includes such plants as *Reseda lutea*, *Verbena officinalis*, *Malva rotundifolia*. Bog-holes at Ballindooly (Baile an Duḃlaiġ (?), the townland of the foundation (?)), NE. of Galway, form one of the few Irish habitats of *Nitella tenuissima*.

TUAM.

The old town of Tuam (Tuaim Ḋá Ġualann, the tumulus of the two shoulders) lies in the flat limestone country. Eastward, where the Clare River flows, there are great stretches of bog and level pasture, and several shallow lakes which in summer usually present flat expanses of white marl, fringed by black peat. A few miles to the SE., at Castle Hacket, Knockmae (Cnoċ Meaḋa, mead hill), a limestone knob, rises to 543 feet, and is tenanted by an outpost of the Burren flora, including *Epipactis atro-rubens*, *Gentiana verna*, and *Euphrasia Salisburgensis*. The last two, with others of the same group, become abundant further W., towards L. Corrib, where crag country prevails. The best plant of the Tuam neighbourhood is *Potamogeton lanceolatus*, in its large form *hibernicus*, which grows in the Grange River, near the ruined mill at Barbersfort. On a bit of wet bog near Killower L. (Loċ Ċille hUiḋre (?), the lake of the dun church (?)), *Eriocaulon septangulare* and *Lobelia Dortmanna* flourish as terrestrial plants—their only station in NE. Galway. On an esker four miles north of the town *Hieracium iricum* is abundant. Along the Clare River *Apium inundatum* var. *Moorei* grows; also *Sium latifolium* and the usually seaside *Carex distans*. *Rhynchospora fusca* and all the Droseras are frequent on the bogs. *Fumaria densiflora* is frequent in tilled ground. Several hotels will be found.

Ballinasloe.—Ballinasloe (Béal Áṫa na Sluaġ, the ford-mouth of the hosts) is situated on the River Suck in the NE. corner of SE. Galway. The river is here slow, with marshy banks, and yields *Sium latifolium* and other similar plants. The surrounding district consists of typical Central Plain country—pasture and bog predominating—and is almost unknown botanically except around the demesne of **Clonbrock** (Cluain Broc, the badgers' bog-island), in NE. Galway, 8 miles NW. of the town. Here *Potamogeton lanceolatus* var. *hibernicus* grows in the river;

and the plants of the neighbourhood include *Prunus Padus*, the three Droseras, *Epipactis palustris*, *Neottia Nidus-avis*, *Orchis latifolia*, *Ophrys apifera*, *Rhynchospora fusca*, *Botrychium Lunaria*.

R. LL. PRAEGER, *Irish Nat.*, v., 239. 1896.

THE COUNTY OF ROSCOMMON.

Co. Roscommon (Roꞅ Comáin, St. Comán's wood, or promontory) would be dull botanically were it not for the River Shannon and its lake-expanses, which form the whole eastern boundary, a length of 60 miles. Another river, the Suck (Suca), an uninteresting stream, margins the county on the west. Area, 850 square miles, consisting, except in the N. and NE., of flattish undulating drift-covered limestone country, mostly under grass. An anticline near L. Boderg (Loċ bó Deiꞃᵹe, the lake of the red cow) exposes the Silurian slates in the ridge of Slieve Bane (Sliaḃ Bán, white mountain, 857 feet), and a more pronounced fold in the NW. produces the Curlew Hills, whose heathery slopes, formed of Old Red Sandstone and Silurian rocks, rise to 863 feet (see CURLEW HILLS, p. 75). In the extreme north, by Lough Allen, a small part of the Connaught coal-field lies within the county, the ground rising there to 1377 feet (see CUILCAGH and SLIEVEANIERAN, p. 101). In the east, the whole western shore of L. Ree belongs to Roscommon (see under LOUGH REE, p. 74, and ATHLONE, *infra*), and other smaller Shannon lakes lie further north. The Curlew Hills are associated with several beautiful lakes, of which L. Key belongs wholly, and L. Arrow partly, to Roscommon (see BOYLE LAKES, p. 75). Grass-land, as is usual in these Central Plain areas, claims nearly two-thirds of the surface of the county; turf bog about one-eighth, crops one-fifth. In the S. is much poor stony land, with bog and esker.

Flora, 553 species—the smallest total of any of the western botanical divisions. This is a result of the absence of mountains, of sea-coast, and of bare limestone, and of the presence of vast areas of grass and bog. Rare plants are comparatively few, and most of them, such as *Chara tomentosa*, *Lathyrus palustris*, *Teucrium Scordium*, are found along the Shannon: but *Hypopithys multiflora* and *Carex axillaris* have their habitat away from the river.

ATHLONE.

Athlone (Béal Áṫa Luain, the ford-mouth of Luan) is an important town situated on the Shannon. On account of the proximity of Lough Ree (see LOUGH REE, p. 74), with its interesting flora, a very pleasant day may be spent here by the botanist, either on foot or by boat. Furthermore, he has the wonderful early Christian monuments of Clonmacnois (Cluain Ṁic Nóis, bog-island of the son of Nos), or the Seven Churches, within a day's excursion, where, when surfeited with antiquities, he may study bogs and eskers on a very imposing scale. In wet meadows on the west side of the Shannon above the town, where it widens into L. Ree, *Lathyrus palustris* and *Lastrea Thelypteris* grow in delightful profusion; with them are *Galium boreale*, *Teucrium Scordium*, *Epipactis palustris*, *Carex filiformis*, and in the river the rare *Chara tomentosa*—all characteristic L. Ree species. Coosan L. (Loċ Cuasán, lake of caves), on the Westmeath side of the lake, furnishes an excellent sample of the L. Ree flora. Several esker-ridges lie close to the town, and in consequence we get a good gravel flora, which includes *Papaver Argemone*, *Arabis hirsuta*, *Cerastium tetrandrum*, *Arenaria tenuifolia*, *Crepis taraxacifolia*, *Linaria minor*. Bogs on the Roscommon side yield *Rhynchospora fusca*, and drains *Carex Pseudocyperus*, *C. teretiuscula*, &c.

LOUGH REE.

Lough Ree (Loċ Ríḃ) is the more northern of the two great lake-like expansions of the Shannon. The upper end is at Lanesborough, and thence it stretches southward for seventeen miles nearly to Athlone. The western side is comprised in Co. Roscommon, the eastern side half in Longford, and half in Westmeath. The lake lies entirely in the great Central Plain of limestone. The shores are irregular. Twice it narrows to one mile, and further south throws out an arm which gives it its greatest width, namely 7 miles. Islands are numerous. Height above the sea 122 feet in summer. Average depth only 20 to 25 feet. Woods are rare; the shores are largely under pasture, and the scenery in general rather bare.

The aquatic flora is chiefly remarkable for *Chara tomentosa*, unknown in Great Britain, and in Ireland confined to the Shannon basin, in which it has a wide range; it is frequent throughout the lake. Other interesting aquatics are *Potamogeton filiformis* (frequent), and *Isoetes lacustris*, with *Lemna polyrhiza* in ditches. The rough limestone shores have a characteristic flora, including quantities of *Teucrium Scordium* (in Ireland confined to the Shannon, save for one station in Clare), *Thalictrum collinum*, *Galium boreale*, *Carlina vulgaris*, *Campanula rotundifolia*, *Chlora perfoliata*, *Ophrys apifera*. On the islands, thickets of *Rhamnus catharticus*, *Populus tremula*, and *Pyrus*

Aria are characteristic, while among the rarer plants of the undergrowth are *Hieracium umbellatum* and *Cephalanthera ensifolia*. In marshy places *Stellaria palustris*, *Cicuta virosa*, *Sium latifolium*, *Galium uliginosum*, *Cladium Mariscus*, *Carex teretiuscula*, *C. filiformis*, *C. Pseudo-cyperus* are characteristic species; *Lathyrus palustris* and *Lastrea Thelypteris* have a wide but local range. In bogs near the lake, *Andromeda polifolia* and *Rhynchospora fusca* are abundant, while on the eastern arm *Stachys Betonica*, very rare in Ireland, is found.

Lough Ree is best explored by boat from Athlone (see ATHLONE, p. 73). A day spent in working the wet meadows above the town (*Lathyrus palustris* and *Lastrea Thelypteris* in abundance), and on to the finely wooded Hare Island (*Cephalanthera ensifolia*), with perhaps a bit of Coosan Lough (good marsh flora and plenty of *Chara tomentosa*) on the way home, will give a very good idea of the vegetation and scenery of the lake, and provide a profitable day's botanizing.

R. M. BARRINGTON and R. P. VOWELL: Report on the Flora of the Shores of Lough Ree. *Proc. Roy. Irish Acad.*, ser. 2 (Science), iv., 693–708. 1887.

THE CURLEW HILLS AND BOYLE LAKES.

A fold in the rocks of the Central Plain, running from the S. end of L. Allen, SW. to Kilkelly (Cill Ċeallaiġ, Ceallach's church), in E. Mayo, reveals the older rocks lying below the limestone, and forms in parts a low heathery range of Old Red Sandstone hills, contrasting with the green pastures of the plain. L. Key and L. Gara lie in breaks in the ridge, and L. Arrow on the limestone on its northern edge; the whole forms a picturesque group of hills and lakes lying around the prettily situated town of Boyle, in Co. Roscommon. L. Gara (222 feet above the sea), a very sinuous, shallow lake, about 4 miles by 3, with bare shores and islands, and a poor vegetation, drains NE. into L. Key (about 3 by 3 miles, 139 feet above the sea), a beautiful and interesting lake, embellished with woods and hills. L. Key in turn drains SE., by means of a slow, winding, lake-like river, into the head-waters of the Shannon, some miles below L. Allen. L. Arrow (4 by 1½ mile, 181 feet above the sea), also a delightful and beautiful lake, adjoins L. Key on the other side of the Curlew Hills, as the Old Red Sandstone ridge in the neighbourhood of Boyle is called. It drains NW. into Ballysadare Bay.

The Curlew Hills (Coꞃꞃṡliaḃ, heron mountains, highest point 863 feet, NW. of Boyle) call for no remark, save the sharp contrast between their calcifuge flora and that of the surrounding plain ; *Lycopodium clavatum* is the only uncommon plant recorded. L. Gara (Loċ Uí Ġáḋra, O'Gara's lake) is rather desolate, with shallow water full of floating algæ, its shores fringed with vast bogs. *Galium boreale* is the only interesting plant seen on its margins, and *Vaccinium Oxycoccus*, *Carex teretiuscula*, and *C. limosa* in quantity on the bogs. The flora of L. Key (Loċ Cé, lake of night (?)) is richer, the best plant being *Lathyrus palustris* near its northern end, growing with *Thalictrum flavum*, *Valeriana Mikanii*, *Carex acuta*, *C. filiformis C. paludosa*, &c. *Ranunculus Lingua* and *Butomus umbellatus* are also found about the lake. From the fine demesne of Rockingham, on the southern shore, *Neottia Nidus-avis*, *Lastrea Thelypteris*, and *Veronica peregrina* are recorded. L. Arrow (Loċ Arḃaċ), the water of which is wonderfully clear (being supplied mostly by springs), like L. Key, needs further examination. *Saxifraga hypnoides*, growing on its shore, is one of the few plants recorded from it. Rising over its western side, Carrowkeel Mountain (1062 feet), an outlier of the Ben Bulben limestone hills, yields some of the plants of that famous range (see KESHCORRAN and CARROWKEEL, p. 99).

Boyle (An Ḃúille (river), Mainistir na Ḃúille (town), the Abbey of Boyle) forms a convenient centre for the exploration of this district.

R. LL. PRAEGER: A Botanist in the Central Plain. *Irish Nat.*, viii., 89–90, 1899.

Roscommon (Ros Comáin, St. Comán's wood, or promontory); the county town, offers no special attraction to the botanist, lying as it does amid great expanses of flattish grass-land. In Carrowroe Park (An Ċeaṫraṁa Ruaḋ, the red quarter) *Hypopithys multiflora* grows plentifully. An excursion eastward to Lough Ree will allow the peculiar flora of the limestone lake-shores to be studied (see LOUGH REE, p. 74). *Lathyrus palustris* may be found in abundance by the Clooneigh River (Aḃainn Ċluana hEiċ, the river of the steed's bog-island). Westward, the banks of the R. Suck are in some places, as at Donamon, good ground for the botanist.

About **Castlereagh**, in the NW. (An Caisleán Riaḃaċ, the grey castle), the Old Red Sandstone breaks through the limestone and forms low hills, with a consequent change of flora ; but plant-records from that district are very few.

EAST MAYO.

Along with Roscommon and NE. Galway, East Mayo (Muiġeo, the plain of the yew-tree) forms an area of over 2500 square miles of almost unbroken Limestone Plain country, consisting roughly of about three-fifths grass-land, one-fifth tillage, and one-fifth bog and waste. The continuity of the limestone is only in a few spots interrupted by a low inlier of Old Red Sandstone or Silurian rocks; the surface only in a few points exceeds 500 feet elevation, and two-thirds of it is below 250 feet. The area of E. Mayo is 778 square miles. Most of it is rather bare and inhospitable in appearance, poor pasture alternating with marsh, bog, and esker; and Claremorris (Clár Ċloinne Muiris, the plain of the Morrises), Castlebar (Caisleán an Ḃarraiġ, Barry's castle), Ballyhaunis (Béal Áṫa hAṁnais), and Ballaghaderreen (Bealaċ a' Doirín, the road of the little oakwood) lying in the plain, offer but small attractions to the botanist. Interest centres along the western margin. In the SW., L. Corrib and L. Mask form the boundary, and their flora is of much interest (see L. CORRIB, p. 63, L. MASK, p. 78, CONG AND CLONBUR, *infra*). The beautiful L. Carra, just north of L. Mask, belongs wholly to E. Mayo (see L. CARRA, p. 79). The extreme NW. corner of the area is crossed by the Slieve Gamph portion of the metamorphic ridge of the Ox Mountains, which introduces a number of calcifuge plants (see OX MOUNTAINS, p. 100). The L. Mask and L. Carra districts contain the northern extremity of the crag country that runs southward thence to Limerick, and a good many of the characteristic plants of the "Burren flora" find their way into E. Mayo. Otherwise the most interesting feature is the extension into the area on non-calcareous rocks of a few of the famous plants of the west coast.

Flora 586 species. The rarer plants include *Ranunculus scoticus*, *Viola stagnina*, *Potentilla fruticosa*, *Saxifraga umbrosa*, *Dabeocia polifolia*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Habenaria intacta*.

Cong and Clonbur.—The neck of land which separates L. Corrib and L. Mask is composed mainly of low-lying limestone, but the western part is hilly, and formed of the old metamorphic rocks of Connemara. Clonbur (An Ḟáirċe, the parish) or Fairhill lies near the dividing line; Cong (Cunga, neck or isthmus) more to the eastward on the limestone. At either village the botanist will find accommodation, and a good head-quarters for exploring the two large lakes and surrounding country. Eastward stretches the Limestone Plain, with some areas of bare crags along its edge; westward the surface soon rises into mountains (see PARTRY MOUNTAINS, p. 83). The flora of the Cong-Clonbur neighbourhood includes *Ranunculus scoticus*, *Draba incana*, *Viola stagnina*, *Rhamnus Frangula*, *Rubus myricæ* var. *hesperius*, *Rosa sepium*, *R. involuta*, *Rubia peregrina*, *Galium boreale*, *Centaurea Scabiosa*, *Crepis paludosa*, *Lobelia Dortmanna*, *Dabeocia polifolia*, *Gentiana verna*, *Euphrasia Salisburgensis*, *Neottia Nidus-avis*, *Epipactis atro-rubens*, *Habenaria intacta*, *Allium Schœnoprasum*, *Potamogeton prælongus*, *P. filiformis*, *Eriocaulon septangulare*, *Sesleria cærulea*, *Pilularia globulifera*. Mount Gable and L. Coolin, to the westward, add *Subularia aquatica*, *Hieracium iricum*, *Polypodium Phegopteris*; while the limestone SE. of Cong yields *Potentilla fruticosa*, &c. See also under LOUGH CORRIB (p. 63) and LOUGH MASK (*infra*).

E. S. MARSHALL and W. A. SHOOLBRED: Irish Plants observed in July, 1895. *Journ. Bot.*, xxxiv., 250–258. 1896.

E. S. MARSHALL: Irish Plants collected in June, 1896. *Ibid.*, 496–500.

LOUGH MASK.

Lough Mask (Loċ Meaṗg) is the second largest of the chain of lakes lying along the edge of the Central Plain, with low limestones stretching from the eastern shore, and the more ancient Connaught highlands rising from the other. The lake is oblong, about 10 miles by 4 miles. with two arms penetrating westward among the hills for several miles. The E. shore of limestone is much fretted, with many promontories, bays, and islands; the W. shore (mainly Silurian slates) less so. Height above the sea 62 feet. The SW. end of the lake belongs to W. Galway; the remainder to E. and W. Mayo. In places, especially towards the south, the shores are well wooded, but the general aspect of the lake is open and bare. The flora has been best worked on the S. shores, where limestone prevails, and it there includes *Euphrasia Salisburgensis*, *Habenaria intacta*, and other characteristic pavement species. But the calcicole flora is not nearly so rich as on the shores of L. Carra adjoining. The

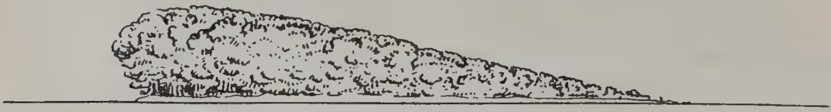


Fig. 8.—Wind-moulding of wood on islands in Lough Mask, as seen from the north. The tallest trees are about 30 feet high.

numerous islands are mostly denuded whale-backs of drift. Some are densely wooded with native trees, chiefly Ash, Oak, Birch, Holly, Alder. Much Scotch Fir has been planted, and it is spreading widely. On the island shores *Galium boreale* is very conspicuous; *Ranunculus scoticus* and *Dabeocia polifolia* occur. The western (metamorphic) side of the lake yields a calcifuge flora, including the last-named, *Listera cordata*, *Agrimonia odorata*, &c. In sandy bays grow *Lobelia Dortmanna* and *Potamogeton filiformis*. An interesting feature of L. Mask is the occurrence round its shores of an old terrace about 15 feet above present storm-mark, showing a former higher level of the lake (fig. 9).

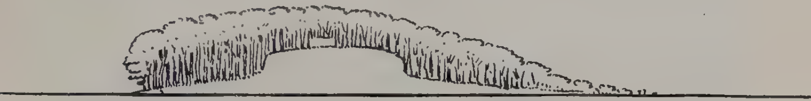


Fig. 9.—East and west section across Devenish, Lough Mask, showing core of Boulder-clay, with ancient church, subtended by old beach, now wooded.

Ballinrobe (baile an Róḃa, the town of the Robe (river) is the best centre for exploring L. Mask. At Cong and Clonbur on the south shore, and at Tourmakeady (Tuar Mic Éadaiġ, the bleachgreen of the son of Eadach) on the west, small hotels will also be found.

R. Ll. Praeger: Botanical Notes, chiefly from Lough Mask and Kilkee. *Irish Nat.*, xviii., 32–40. 1909.

LOUGH CARRA.

Lough Carra (Fionnloċ Ceara, fair lake of Ceara) is a pretty and interesting lake lying on the limestone in E. Mayo, near the eastern margin of the great metamorphic area, and close to the northern end of L. Mask. It is of very irregular shape, with numerous peninsulas and islands. Length 6 miles, breadth 1 to 2 miles. The shores and islands are frequently wooded, the islands with native vegetation, including Ash, Oak, Elm, Alder, Aspen, Birch, Cherry, Elder, Holly, Hawthorn, Spindle-tree, Hazel, Mountain Ash, White Beam, Willows, Juniper, and both species of Buckthorn. The shores are mostly stony. The water is of a wonderful pale pellucid green, owing partly to its purity (being mainly derived from springs) and partly to a curious soft calcareous deposit which envelops the whole bottom, and which is very deleterious to plant-life, especially in the southern portion of the lake. L. Carra lies

69 feet above the sea. The surrounding country is low. In some places on the W. side drift is absent, and limestone crags are developed. The northern part of the lake is deeper than the southern, and the shores rather higher. The shores, especially on the islands, show four distinct zones of vegetation:—(1) Hydrophyte zone.—A very poor flora, *Potamogeton filiformis*, which is frequent, being the most interesting plant. (2) Schænus zone.—A wet-soil calcicole group dominated by *Schœnus nigricans*, with abundance of *Epipactis palustris*, *Galium boreale*, *Cnicus pratensis*, *Parnassia palustris*, *Pinguicula vulgaris*, *Habenaria conopsea*, *Selaginella selaginoides*; more locally *Ophrys apifera*, *O. muscifera*, and *Lastrea Thelypteris*. (3) Sesleria zone.—A dry-soil calcicole association, with much *Sesleria cærulea*, *Thalictrum collinum*, *Viola canina*, *Rhamnus Frangula*, *Rubus saxatilis*, *Carlina vulgaris*, *Leontodon hispidus*, *Campanula rotundifolia*, *Chlora perfoliata*, *Plantago maritima*, *Orchis pyramidalis*, and rarely *Gentiana verna* (northern extremity of Irish range). (4) Woodland zone.—With the trees above-mentioned, and a shade flora including *Orobanche Hederæ*, *Neottia Nidus-avis*, and *Epipactis latifolia*.

The limestone pavements are interesting as forming the northern extremity of the great tract of bare limestone which, beginning in Co. Limerick, attains its maximum development on the Burren hills in Clare, and continues along the chain of lakes on the W. edge of the Limestone Plain northward to L. Carra. The very remarkable flora which characterizes this formation in Clare and Galway is much reduced by the time L. Carra is reached; but its most interesting member, *Habenaria intacta*, remains, and is frequent on the crag-lands here. *Aquilegia vulgaris*, *Rubia peregrina*, and *Hieracium iricum* also occur, along with most of the plants of the Sesleria zone of the shores. On roadsides round the lake the alien *Matricaria discoidea* is extremely abundant.

Ballinrobe is the best place to stay for the exploration of L. Carra.

R. Ll. Praeger: The Botany of Lough Carra. *Irish Nat.*, xv., 207–214. 1906. The Calcareous Deposit in Lough Carra. *Ibid.*, 232–233.

WEST MAYO.

West Mayo (Muıᵹeo, the plain of the yew-tree) forms along with W. Galway a very distinct botanical province. The physical features—imposing mountain-groups, innumerable lakes set in wild bog-land, and a rugged coast—are due to the geological structure of the district, and the hard igneous and crumpled metamorphic rocks of which it is mainly composed. In the S., between the Killery fiord and Clew Bay, the country is very mountainous, the grand mass of Mweelrea, rising to 2688 feet, being the highest hill in the West of Ireland. Standing apart, the beautiful cone of Croaghpatrick (2510 feet) overlooks the waters of Clew Bay.

Clew Bay itself and its myriad islets appear to have been formed by the dissolution of the limestone, which here extends from the eastward to meet the Atlantic. Further N., range upon range of metamorphic hills extends from the eastern margin, where the huge dome of Nephin (2646 feet) overlooks L. Conn, right across the district to the extreme W., where at the extremity of Achill I., Croaghaun (2192) drops in one grand precipice into the ocean (plate 14). The northern third of the area is not so mountainous, few points rising to over 1000 feet; it consists of a vast undulating bog-land, with no road or house for miles together, terminating in the N. in magnificent cliff-ranges 600 to 800 feet in height. Limestone, with its softer outlines and attendant grass-land and cultivation, forms the E. margin, sweeping from beyond Killala round L. Conn (see under BALLINA, p. 87), and coming in again in the Westport (see WESTPORT, p. 84) and Castlebar districts. The largest lake is L. Conn, the limestone shores of which have a distinctive flora (see LOUGH CONN, p. 87). L. Cullen, which adjoins on the metamorphic area, is practically a continuation of it. The NW. shores of L. Mask, formed of metamorphic rocks, belong to W. Mayo. Several considerable sheets of water, notably Carrowmore L. (see ERRIS, p. 89) and L. Feeagh, and numerous small lakes, lie among the bogs and moors of the metamorphic area. Many islands lie off the W. coast, including Achill (50 square miles), the largest Irish island (see ACHILL ISLAND, p. 92), and other considerable insular areas (see CLARE ISLAND, p. 91, and INISHTURK, p. 90). Of the total area of 1336 square miles, over half is bog and mountain land. Grass-land is down to less than one-third, and crops to less than one-tenth.

W. Mayo shares with W. Galway the fame of being the home of the extremely interesting group of Pyrenean Heaths already mentioned; it forms the head-quarters of *Erica mediterranea*, just as the more southern division does of *Dabeocia polifolia*; in these two areas, the one increases N., the other S. (see fig. 15). Many of the other famous Connemara plants, such as *Saxifraga umbrosa* and *Eriocaulon septangulare*, are also present; and the flora of the two divisions together forms a very homogeneous whole.

Flora, 645 species. The more interesting plants other than those mentioned above include *Ranunculus scoticus, Helianthemum guttatum, Cochlearia grœnlandica, Poterium officinale, Saxifraga decipiens, Euphorbia hiberna, Adiantum Capillus-Veneris, Lycopodium inundatum.*

THE MWEELREA MOUNTAIN-GROUP.

Mweelrea (An Maol Riaḃaċ, the grey bald headland, or mountain-top, 2688 feet), the highest mountain in the West of Ireland, is one of a very fine group lying on the N. side of the Killery fiord. Silurian and Ordovician rocks prevail here, and slate is the usual material of which the mountains are built. The higher hills are grouped close together, the mass being cut into three portions by the lovely Doo Lough valley (Duḃ-loċ (?), black lake), running south into the Killery, and the tributary valley Glenummera (Gleann Iomaire, ridge-glen) descending into Doo Lough from the east. Mweelrea, with its neighbours Benbury and Benlugmore (Beann Log Mór (?), peak of great hollows), the W. portion of the group, forms a huge flat-topped mass edged with spurs, cliffs, and ravines of thoroughly alpine character, and superbly picturesque. The SE. section is dominated by Bengorm (Beann Ġorm, blue peak, 2303 feet), and the NE. by Sheffry (Seiṫḃre (?)), also called Loughty (Cnoc Loċta (?)) or Tievummera (Taoḃ Iomaire, ridge side, 2504 feet). A four-mile radius from the S. end of Doo L., which lies only 109 feet above the sea, will enclose the whole mass, which forms one of the finest mountain-groups to be found in Ireland, intersected by valleys of wonderful beauty.

The flora of the lofty precipices and cirques is not so alpine as might be expected; the Mweelrea section and the Sheffry ridge, lying north of Glenummera, are about equally rich as regards the flora of the high grounds. The following list shows what the botanist may expect in his exploration of this area:—*Thalictrum minus, Subularia aquatica, Saxifraga stellaris, S. oppositifolia, S. umbrosa, Sedum Rhodiola, Rubia peregrina, Hieracium anglicum, H. iricum, Lobelia Dortmanna, Vaccinium Vitis-Idæa, Arctostaphylos Uva-ursi, Dabeocia polifolia, Erica mediterranea, Oxyria digyna, Salix phylicifolia, S. herbacea, Juniperus communis, J. nana, Carex rigida, Cystopteris fragilis, Lycopodium alpinum, L. clavatum, Isoetes lacustris.* While a few of the more alpine of these descend into the lower grounds (below 1000 feet), *Rubia peregrina* and *Erica mediterranea* are the only ones whose range is quite lowland. To this list must of course be added many of the characteristic western plants whose presence comes to be taken for granted when dealing with the flora of the Connaught boglands, such as *Drosera anglica*, *D. intermedia*, *Utricularia intermedia*, *Rhynchospora fusca*, *Eriocaulon septangulare*, *Cladium Mariscus*, *Carex limosa*, *C. filiformis*, *Lastrea æmula*, *Osmunda regalis*, *Hymenophyllum tunbridgense*, *H. unilaterale*, &c.

H. C. HART: Report on the Flora of the Mayo and Galway Mountains. *Proc. Roy. Irish Acad.*, 2nd ser., iii. (Science), 716–730. 1883. N. COLGAN: Botanical Notes on the Galway and Mayo Highlands. *Irish Nat.*, ix., 114–116. 1900.

Killery Harbour.—The beautiful fiord-like sea-inlet of Killery (Caol-ṡáile, narrow inlet of the sea) lies surrounded by the mountains described under the headings MWEELREA GROUP (p. 82), PARTRY MOUNTAINS (*infra*), and KYLEMORE AND BENCHOONA (p. 67), and its flora is the flora of the hills at the base of which it lies. Killery stands for one of the loveliest districts in Ireland.

Leenane (Líonán Ċinn Ṁara, the inlet of the head of the sea), where there is good hotel accommodation, is well situated as a centre for exploration, both by land and sea, of the Killery fiord and the adjoining mountain-groups (see last paragraph). The hill which rises immediately south of the hotel yields *Thalictrum collinum*; *Saxifraga stellaris*, *Sedum Rhodiola*, *Habenaria albida*, *Carex rigida*, *Lastrea Oreopteris*.

THE MAAMTRASNA OR PARTRY MOUNTAINS.

From Leenane, at the head of the Killery fiord, a range of high hills, the Partry Mountains (Sliaḃ Partraiġe, the mountain-range of the Partraighe, a tribe with Art as ancestor), runs NE. for about 14 miles. The summit forms a great table-land, or series of table-lands, dropping NE. from about 2000 to 1000 feet. The highest point is Maamtrasna (Máḋm Trasna, cross mountain pass), 2207 feet. On the NW. side the hills descend in a bold slope into the valley of the Erriff River (Airḃ (?)), through which the Westport-Leenane road runs. The SE. side, which faces L. Mask, is irregular and most picturesque, with high cliffs and cirques, embosoming lakes. But this aspect is unfavourable for alpine vegetation, and the flora of the range is very poor. *Hieracium anglicum*, *Dabeocia polifolia*, *Salix herbacea*, *Juniperus nana*, *Deschampsia alpina* are recorded between 1350 feet and the summit of Maamtrasna, while about Lough-na-dirk-more grow *Saxifraga stellaris*, *Oxyria digyna*, *Eriocaulon septangulare*. In spite of the absence of botanical riches, a tramp from the beautiful Lough Nafooey NE.

over the hills to the Owenbrin River (Aḃainn Ḃroin (?)) can be confidently recommended. The Partry or Maamtrasna range forms part of the mass of Silurian slates that extends thence W. along the Killery to Mweelrea.

CROAGHPATRICK.

One of the noblest mountains in Ireland. Croaghpatrick (Cruaċ Ṗádraig, St. Patrick's rick) rises in a beautiful cone from the island-studded waters of Clew Bay to a height of 2510 feet. The peak is flanked east and west by rugged shoulders for a few miles, and the group thus formed stands in conspicuous isolation from the other mountains of Mayo. "The Reek" (rick), as it is locally called, is formed mainly of quartzite, with some gneiss and schist. A precipitous scarp on the N. face yields *Thalictrum alpinum*, *Saussurea alpina*, *Oxyria digyna*, *Salix herbacea*, *Asplenium viride.* Other high-level plants are *Sedum Rhodiola*, *Saxifraga umbrosa*, *Hieracium anglicum*, *Juniperus nana.* In the middle zone occur *Rubus saxatilis*, *Crepis paludosa*, *Dabeocia polifolia.*

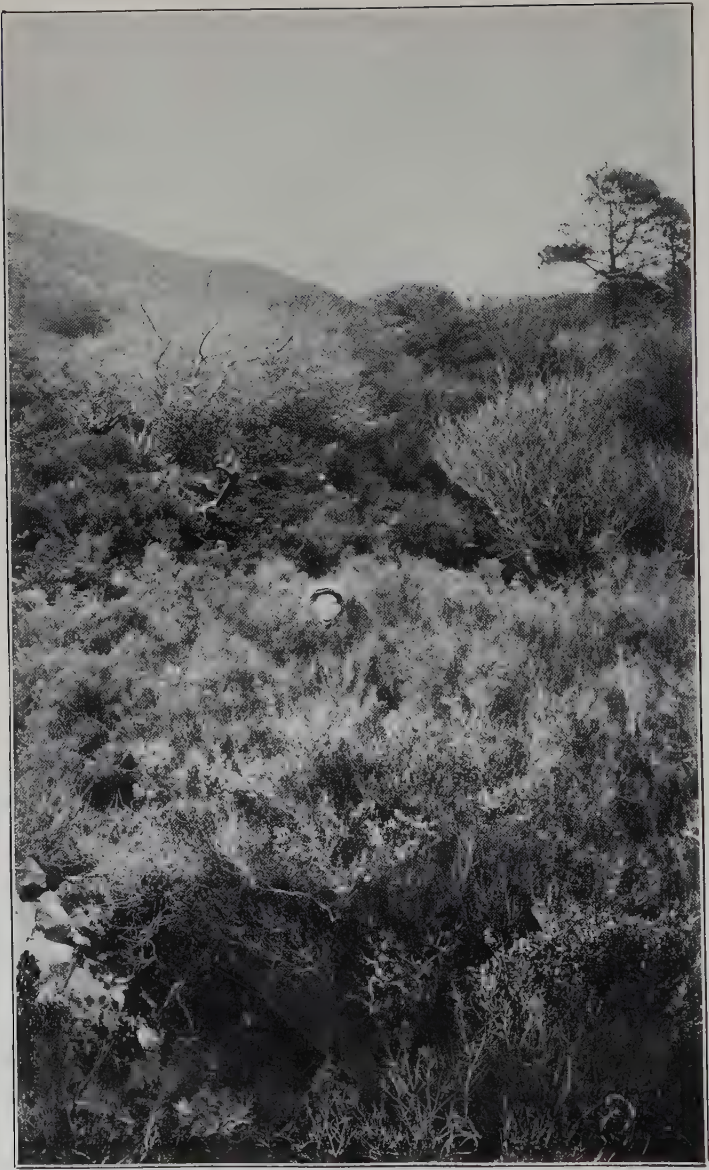
Croaghpatrick is easily visited from Westport. A little chapel, erected on the summit a few years ago, is approached by a bridle-path from the base near Murrisk, which gives easy access to the higher grounds. Additional interest may be added to the day's work by a visit to the ruins of Murrisk Abbey (Muireasg, a marshy dictrict). *Allium Babingtonii* and *Iris fœtidissima* are two interesting introduced plants of the low grounds.

H. C. HART: Report on the Flora of the Mountains of Mayo and Galway. *Proc. Roy. Irish Acad.*, ser. 2, iii. (Science), 702–705. 1883.

WESTPORT AND NEWPORT.

It is a remarkable experience to drop down from the wild metamorphic highlands which lie north and south, to the shores of Clew Bay (Cuan Moḋ), where nestle the little towns of Westport and Newport. Bog and heather give way abruptly to grass and tillage, and gnarled rock is replaced by trees. The limestone drumlins (or whale-backed ridges), dipping down below sea-level, produce a labyrinth of grassy islands that almost shuts out a view of the bay. The limestone area is too much farmed to be attractive to the botanist, and in any case few of the characteristic limestone plants push into this remote corner.

About Westport *Nasturtium sylvestre*, *Crepis paludosa*, *Rumex Hydrolapathum*, and *Potamogeton Zizii* are recorded. Around



Erica mediterranea at Mallaranny, W. Mayo
Growing six feet high around the head of Bellacragher Bay. June, 1907.
R. Welch, Photo. *To face p.* 85.

Westport Quay *Statice rariflora* grows remarkably luxuriantly, and *Lepidium Draba* is well established. Westport is chiefly important to the botanist as forming the base for the exploration of Croaghpatrick and the wild country beyond it (see CROAGHPATRICK, p. 84). The vicinity of the smaller town of Newport, lying a couple of miles N., with hills and lakes close at hand, is richer; and the botanist may find *Rubus iricus*, *Eleocharis uniglumis*, *Isoetes lacustris*, *I. echinospora*, *Nitella translucens*; and *Erica mediterranea* has its eastern limit close to the town. Newport lies within striking distance of the Nephinbeg range of hills (see under NEPHIN AND NEPHINBEG, p. 86), and of the wild lakes L. Feeagh (Loċ Fiaċ, raven's lake) and L. Beltra (Béal Tráġa, mouth of the strand).

E. S. MARSHALL: Plants observed in West Mayo, June, 1899. *Journ. Bot.*, xxxviii., 184–188. 1900.

MALLARANNY.

Mallaranny, or Molreny (Mullaċ Raiṫniġe, summit of fern), where the railway company has erected a large tourist hotel, overlooking Clew Bay, is the best centre for the exploration of the Nephinbeg group of hills (see NEPHIN AND NEPHINBEG, p. 86), and of Curraun Achill (*infra*). It is worth while going to Mallaranny to see one plant only, namely, *Erica mediterranea*, in its glory. It greets the traveller from the edge of the platform as he descends from the train; and around the head of Bellacragher Bay (Béal ÁṫaCreaċair (?)) close by, it grows in masses, six feet and more in height, a sheet of pale purple before winter is fairly over. The plants recorded from the immediate neighbourhood of Mallaranny include *Rubus iricus*, *Saxifraga umbrosa*, *Centunculus minimus*, *Lamium intermedium*, *Utricularia intermedia*, *Juniperus nana*, *Listera cordata*, *Carex limosa*, *Phleum arenarium*. The maritime flora is limited, as is usual in the west.

E. S. MARSHALL: Plants observed in West Mayo, June, 1899. *Journ. Bot.*, xxxviii., 184–188. 1900.

CURRAUN ACHILL.

Curraun Achill (Corrán Aicle, the sickle (promontory) of Achill) is a wild mountainous sea-girt area, forming for the most part a heathery table-land of 1300–1700 feet, edged with cliffs in many places. Old Red Sandstone forms the southern part, but soon gives way to the ancient metamorphic series.

On the lower grounds *Erica mediterranea* is abundant, *Dabeocia polifolia* has its most northerly Irish and European station, and the Filmy Ferns, London Pride, and other western plants occur. On the plateau, *Arctostaphylos Uva-ursi*, *Empetrum nigrum*, and *Juniperus nana* form a thick carpet; and *Salix herbacea*, *Carex rigida*, and *Lycopodium alpinum* occur high up. Hotels at Mallaranny and Achill Sound provide the visitor with convenient starting-points for the working of this treeless, almost houseless and roadless area.

HART: Mayo and Galway Mountains, *cit.*

NEPHIN AND NEPHINBEG.

Nephin (Cnoc Néıꝼınn) forms a huge hump of quartzite, 2646 feet, rising from the W. shore of L. Conn, and close to the edge of the limestone. In height in the West of Ireland it is exceeded only by Mweelrea: but the even weathering of the dry intractable quartzite furnishes no suitable habitat for the alpine plants which one might hope to find on so lofty a summit. *Saxifraga stellaris*, *Hieracium anglicum*, *Arctostaphylos Uva-ursi*, *Vaccinium Vitis-Idæa*, *Salix herbacea*, and *Carex rigida* occur, and *Saxifraga umbrosa* is as abundant on the summit as at the base. *Armeria maritima* and *Silene maritima* also haunt the high grounds.

A few miles W. of Nephin, separated from it by a deep valley, **Birreencorragh** (bıꞃín Coꞃꞃaċ, little spit with corners) and Buckoogh (boṫ Cuaċ (?), habitation of cuckoos (?)) form an irregular mass of quartzites and schists rising to 2295 feet, dropping on the W. into L. Feeagh (Loċ Ꝼıaċ, raven's lake). These hills are uninteresting botanically.

West again of L. Feeagh, **Nephinbeg** (Néıꝼınn ḃeaᵹ, Little Nephin) and its neighbours form a lofty ridge, stretching from Clew Bay to Bangor (beannċaꞃ, peaks), with an expanded southern end. The principal points are Cushcamcarragh (Coıꞅ Ċam Ċaꞃꞃaċ, crooked rugged point, 2343 feet), Glennamong (Ᵹleann na Monᵹ, the glen of the marsh grasses, 2067), Nephinbeg (2065), and Slieve Cor (Slıaḃ Coꞃꞃ, odd mountain, 2369). Here again quartzites mainly prevail. These hills rise from the vast bogs of Erris with flanks clothed with peat, but along the crest there is some fine rock-sculpture. Nevertheless the alpine flora of the range is poor, embracing *Thalictrum alpinum*, *Saxifraga oppositifolia*, *S. stellaris*, *S. umbrosa*, *Sedum Rhodiola*, *Saussurea alpina*, *Arctostaphylos Uva-ursi*, *Oxyria digyna*, *Salix herbacea*, *Carex rigida*, *Lycopodium alpinum*, *Isoetes* *lacustris.* Descending the hills S., W. or N. we get into the domain of *Erica mediterranea*, with Filmy Ferns, Water Lobelia, &c.

The district may be explored from Crossmolina or Pontoon in the east, or from Mallaranny (where there is a large tourist hotel) or Newport in the south.

H. C. Hart: Report on the Flora of the Mountains of Mayo and Galway. *Proc. Roy. Irish Acad.*, ser. 2, iii., 705–709. 1883. N. Colgan: Botanical Notes on the Galway and Mayo Highlands. *Irish Nat.*, ix., 116–118. 1900.

BALLINA.

Ballina (béal Áṫa an Ḟeaḋa, the ford-mouth of the wood) is situated on the River Moy where it becomes tidal, in a limestone area. Northward, the river broadens to the sands of Killala Bay. To the SW., L. Conn lies at a distance of a few miles (see Lough Conn, *infra*), with the huge mass of Nephin towering behind it (see Nephin, p. 86). South-eastward Slieve Gamph, the W. end of the Ox Mountains, presents a series of rather sterile hills (see Ox Mountains, p. 100). About Ballina itself few interesting plants have been found—*Poa compressa* on the railway, *Matricaria discoidea* on roadsides, *Epipactis palustris* in marshy ground. Good hotel accommodation.

Killala (Cill Alaiḋ, Church of Aladh (?)) is a village with a fine round tower, on the shore eight miles NW. of Ballina. *Draba incana* and *Gentiana Amarella* grow on sandhills here, and *Scirpus rufus* in salt marshes. About the picturesque ruins of Moyne Abbey (Maiġean (?)), between Killala and Ballina, *Inula Helenium* and *Petroselinum sativum* still tell of the old monkish kitchen-garden.

At **Inishcrone** (Inis Eisgir Aḃann, the island of the eskers of the river), opposite Killala, on the Sligo side of the river-mouth, one may stay, and find an interesting and but little explored district round about.

LOUGH CONN.

Lough Conn (Loċ Con, hound's lake) lies near Ballina, in NW. Mayo. It is 9 miles long by 2 to 3 miles wide, and 41 feet above the sea. L. Cullin, 2 miles by 2 miles, which adjoins on the S., is really portion of the same depression, cut off from the main lake by a narrow rocky ridge, and may be treated as portion of L. Conn. A stream only a few yards in length joins the two, and the difference in water-level is one foot. L. Cullin drains into the Moy, which adjoins on the E. L. Conn lies on the low limestone plain of the Moy (An Ṁuaiḋ), with the metamorphic highlands towering close on the W. side; but old gneissic rocks surround its S. end and L. Cullin—the W. end of the great "Caledonian" fold which forms the Ox Mountains.

The limestone shores of the lake are low and mostly very stony, with a number of outlying islands and reefs. The characteristic scene on the E. shore consists of a slope like a badly macadamized road gay with *Poterium officinale*, *Thalictrum collinum*, *Rubus saxatilis*, *Galium boreale*, *Plantago maritima*, all in profusion, set in sheets of Wild Thyme, with clumps of *Lithospermum officinale* and *Rubus saxatilis*. *Poterium officinale* is *par excellence* the characteristic plant of L. Conn. It occurs on the shores (and only there), right round both Conn and Cullin, being elsewhere in Ireland only found sparingly in a few stations in the NE. On either side of the middle of the lake a boggy patch on the limestone yields *Erica mediterranea*, elsewhere known only in the wild metamorphic country nearer the western seaboard in Mayo and Galway.

Once the limestone is left, the landscape gets bolder, and rocky bluffs with a heather flora overhang the lake, so that the scenery around Pontoon, on the neck separating L. Conn from L. Cullin, is very picturesque, resembling that of Connemara lakes, but without their most characteristic plants. *Taxus baccata* and *Populus tremula* grow on the rocks, with *Hieracium Orarium* (only Irish station), *H. iricum*, *H. vulgatum*, *H. umbellatum*; and *Lobelia Dortmanna* in the water. The last is the only interesting hydrophyte yet recorded from the lake. *Cephalanthera ensifolia* has been found near Pontoon bridge.

L. Cullin (Loċ Cuilinn (?), holly (?) lake), surrounded by metamorphic rocks, has a flora resembling that of L. Conn, with the calcicole species omitted. *Sanguisorba officinalis* still prevails, and *Galium boreale; Equisetum trachyodon* grows on the shores and in Drumman Wood (Dromanna, ridges); *Potamogeton filiformis* at the outlet and near Pontoon.

The visitor to L. Conn will find accommodation at Crossmolina (Cros Uí Ṁaoilḟíona, O'Maoilfhíona's cross), at the Lough Conn Hotel on the Errew peninsula (Aireaċ Loċa Con, *Aireach* of Lough Con), in the middle of the lake, and at Pontoon. The towering mass of Nephin (2646 feet) rising on the western shore imparts a most impressive character to its beautiful scenery (see NEPHIN, p. 86).

R. LL. PRAEGER: Round Lough Conn. *Irish Nat.*, ix., 224–229, 1900.

ERRIS.

The Barony of Erris comprises NW. Mayo as far south as Achill and Mallaranny. It presents a more unbroken expanse of moor, mountain, and bog than can be found elsewhere in Ireland. The mountains are dealt with under the heading NEPHIN AND NEPHINBEG (p. 86). The large peninsula of the Mullet is described separately (see THE MULLET, *infra*). Elsewhere the ground is undulating, forming a vast moorland, with a low indented coast-line on the W., while the N. coast is magnificently precipitous. On this treeless, trackless waste, *Erica mediterranea* has its head-quarters, and is widely spread; but we have passed beyond the range of *Dabeocia polifolia*. *Saxifraga Hirculus* has been found in the N., near Ballycastle (Baile an Ċaisil, the town of the *caiseal* (circular stone fort)). Everywhere the characteristic flora of the Mayo-Galway uplands prevails—Royal Fern fringing the streams, London Pride decking the rocks, Water Lobelia and occasionally Pipewort in the lakelets, *Rhynchospora fusca*, &c., on the bogs.

Carrowmore Lake (An Ċeaṫraṁa Ṁór, the great quarter) is an extensive sheet of water, about 4 miles in length, open and desolate. It has not been exhaustively examined, but appears to yield the characteristic local flora—*Erica mediterranea* forming a broad belt on the shore above storm-level, with *Lobelia Dortmanna* in the water. Belmullet in the west, and Mallaranny in the south, provide good hotels for the visitor; and primitive accommodation may be obtained at Bangor in the centre of the area.

C. C. BABINGTON: On the Botany of Erris. *Mag. of Zool. & Bot.*, ii., 119–124. 1838. D. MOORE: Observations on the prevailing and rarer Plants of Erris, and of some other portions of the County of Mayo. *Nat. Hist. Review*, vii. (Proc.), 414–417. 1860.

THE MULLET.

The Mullet (An Muirṫead, the mullet (peninsula (?)) is a wild narrow peninsula, with a surface divided between peat and blown sand, lying N. of Achill on the W. Mayo shore. Its longer axis (15 miles) lies parallel to the coast, with Blacksod Bay (Cuan an Ṗóid Ḋuiḃ, bay of the black sod) between; its area is 45 square miles. The isthmus which connects it with the mainland at the little town of Belmullet (Béal a' Ṁuirṫid, the mouth of the mullet) narrows to 300 yards. Most of the area is quite low, and the greatest hill rises only to 434 feet. Nowhere on the Irish coast can the effects on the flora of exposure and a continually wet soil be better studied than on this treeless tract. No bush raises its head more than a few feet above the ground. Stunted *Senecio aquaticus* brightens the pastures instead of *S. Jacobæa*; the Purple Loosestrife is through the fields everywhere; and no bank is too dry for *Hydrocotyle vulgaris* and *Anagallis tenella*. The total flora (350 species) of this 45 square miles of land, possessing a large variety of features—cliffs, moors, cultivation, sandy and muddy shores, sand-dunes, lakes, and rocks—is actually smaller than that of Clare Island (6 square miles), and only a little larger than that of Inishturk, $2\frac{1}{4}$ square miles. The flora of the dunes, as is usual on the west coast, is very limited in variety. Several lakes, some of them brackish, occur, and yield some interesting species—*Lobelia Dortmanna*, *Ceratophyllum demersum*, *Potamogeton filiformis*, *Eriocaulon septangulare*, all within 50 feet of sea-level. The boggy areas in the N. yield stunted *Erica mediterranea*, and abundance of *Arctostaphylos Uva-ursi*. The field and roadside flora includes *Rubus iricus*, *Centunculus minimus*, *Lamium intermedium*. The cliffs which fringe the N. coast are hung with *Sedum Rhodiola* and *Spergularia rupestris*. Several hotels at Belmullet. Steamer service from Sligo, along the magnificent cliff-bound coast of N. Mayo, or car from Ballina.

Inishkea (Inıꞅ Sᵹéıċ, island of the shield (?)) consists of two reefs of gneiss, each with an area of about 400 acres, and a population of about 150 souls. The S. island rises to 230 feet. Both are absolutely wind-swept, a few prostrate Rubi being the only shrubby vegetation. Plantago sward is well developed, and also a close sand-sward with *Daucus Carota*, &c., growing only an inch high (fig. 2, p. 6). In storms the ocean pours across the islands in various places. *Cakile maritima* grows as a weed in potato fields. Flora, 185 species and subspecies. Two plants, *Hyoscyamus niger* and *Convolvulus arvensis*, are not known elsewhere in W. Mayo. Each island possesses a safe little sandy bay on its leeward side, and the place is now the centre of a whale fishery.

R. LL. PRAEGER: The Flora of the Mullet and Inishkea. *Irish Nat.*, xiv., 229–244. 1905.

INISHTURK.

Inishturk (Inıꞅ Ꞇoꞃc, boars' island) rises boldly from the sea on all sides, with very fine cliff-scenery in the west. The greatest elevation is 629 feet. Only a small part, in the most sheltered situations, is under cultivation, the remainder consisting of grassy heath and maritime sward, with the Silurian slate constantly breaking through. Area 2¼ square miles. The island lies seven miles out from the nearest land, and supports twenty-three families, who live by farming and fishing. The few native trees of the island, such as Poplar, Birch, Holly, and Crab, do not attain a height of more than 3 or 4 feet, but sometimes twice that breadth. The herbaceous vegetation is usually correspondingly stunted. The flora is remarkably large in comparison with that of adjoining islands, numbering 329 species and subspecies. Rocks over the sea yield *Cochlearia grœnlandica*, *Sagina subulata*, and quantities of *Sedum Rhodiola*. Tiny lakelets in the W. are tenanted by *Lobelia Dortmanna* and *Isoetes lacustris*. *Euphorbia hiberna* is abundant on slopes over the harbour. *Rubus Borreri* and *R. iricus* are among the most abundant of the half-dozen brambles. *Saxifraga umbrosa* is of course everywhere, even on the walls of houses. The rarest Irish plant on the island is *Helianthemum guttatum*, which has its Hibernian head-quarters on Inishbofin near by. *Centunculus minimus* is not infrequent, and *Matricaria discoidea* has colonized about the harbour. *Allium Babingtonii* occurs. Renvyle is the most convenient point of embarkation for Inishturk, or the adjoining Tully pier; but there is no accommodation on the island for visitors.

R. Ll. Praeger: The Flora of Inishturk. *Irish Nat.*, xvi., 113–125. 1907.

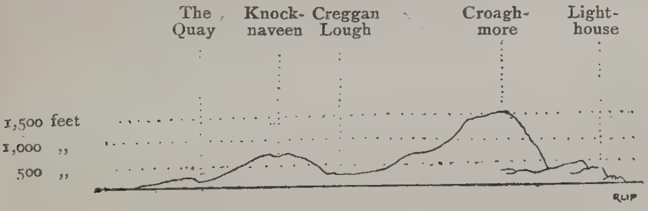


Fig. 10.—Outline of Clare Island from the north-east.

CLARE ISLAND.

Clare Island lies across the mouth of Clew Bay, and is about three miles distant from the land on both the N. and S. sides of the entrance. It has an area of 6⅙ square miles, about one-third of which is under tillage or pasture, the remainder being mainly stony heath. The dominating feature of the island is the great east-and-west ridge of Croaghmore (An Cruaċ Ṁór, the great rick), which rises on the northern shore to a height of 1520 feet, and on the seaward side plunges down in one huge precipice into the ocean. Most of the coast is cliff-bound. A few tiny lakelets occur. Trees and bushes are very rare, but as compared with Achill the deeper hollows and greater amount of drift conduce to a flora with a less barren aspect than that of the larger island. Clare I. is formed mainly of Silurian slates.

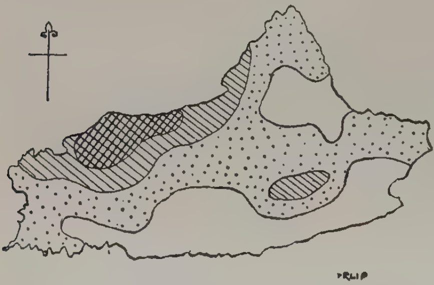


Fig 11.—Sketch-map of Clare Island.

Unshaded area = farm land. Dotted = unreclaimed land up to 500 feet. Hatched = do., 500 to 1,000. Cross-hatched = do., 1,000 to 1,520 feet. Scale, ½ inch = 1 mile.

The flora numbers 368 species and subspecies. Interest centres on the great scarp of Croaghmore, where a group of alpine plants flourishes. The most conspicuous of these are *Silene acaulis* and *Saxifraga decipiens*; with them are *Saxifraga oppositifolia*, *Sedum Rhodiola*, *Saussurea alpina*, *Hieracium hypochæroides*, *Oxyria digyna*, *Asplenium viride*. The maritime, meadow-land, and heath floras possess no points of special interest. The marsh and water plants include *Drosera anglica*, *Carex limosa*, *Utricularia intermedia*, *Nitella translucens*. As is usual in the west, *Saxifraga umbrosa* and *Lastrea æmula* are everywhere in evidence. The prevailing brambles are *Rubus plicatus*, *R. pulcherrimus*, *R. fuscus*, and *R. discolor*. The American alien *Matricaria discoidea* has already invaded the island. A little hotel at the quay provides accommodation to the wanderer. The island can be reached via Achill Sound, or via Roonah Quay (Céiḃ Ruḋa an Áṫa—Ruḋa an Áṫa = the point of the ford), beyond Louisburgh.

R. Ll. Praeger: The Flora of Clare Island. *Irish Nat.*, xii., 227–294. 1903.

ACHILL ISLAND.

Achill (Acaill, eagle, from *aquila*) is the largest island on the coast of Ireland, its area being 57 square miles. It is formed of gneiss, mica schist, and quartzite. The island may be described as consisting of wild undulating bogland, relieved by small patches of cultivation, and dominated by three ridge-like mountains—Croaghaun (2192 feet) in the W.; Slievemore

(Sliaḃ Mór, great mountain, 2204 feet) on the N. shore; and Meenaun (1530 feet) towards the S. Croaghaun (Cruaċán, little rick) has suffered erosion by the Atlantic, and drops into the ocean in a glorious precipice of the full height of the mountain. Lakelets are numerous, and blown sand occurs. The coast is usually precipitous in the W., low in the E., where a winding channel (Achill Sound) severs the island from the mainland. The hotels are grouped in the N., at Dugort (Duḃġort, black field), at the E. base of Slievemore, and at the Sound, which narrows to a few hundred yards, and is crossed by a causeway and swinging bridge close to the railway station and hotel.

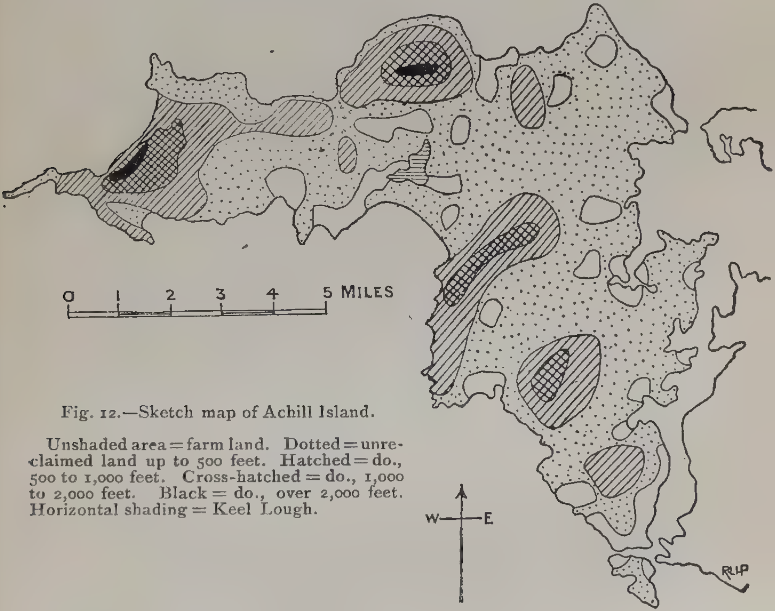


Fig. 12.—Sketch map of Achill Island.

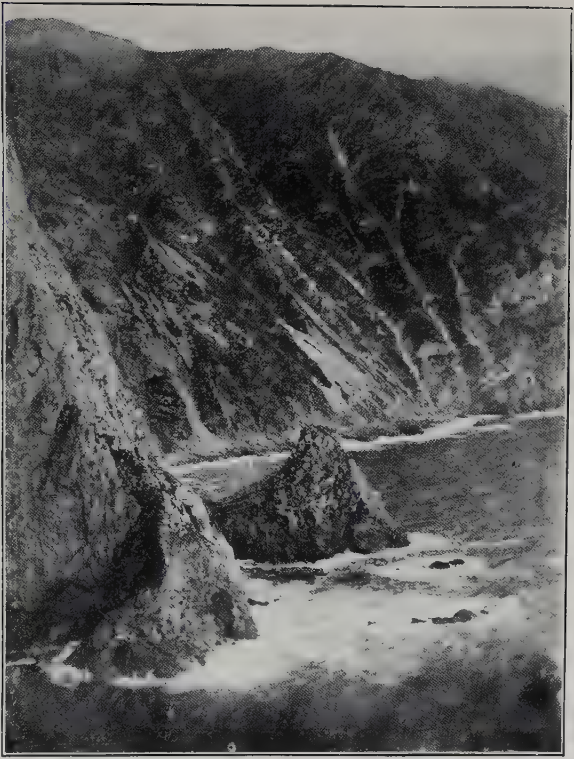
Unshaded area = farm land. Dotted = unreclaimed land up to 500 feet. Hatched = do., 500 to 1,000 feet. Cross-hatched = do., 1,000 to 2,000 feet. Black = do., over 2,000 feet. Horizontal shading = Keel Lough.

The flora of Achill numbers 420 species and subspecies. The striking features of the vegetation are its treeless and wind-swept character, and the almost unbroken continuity of bog and heath associations. Inside the narrow fringe occupied by the halophile groups, the moorland flora holds undisputed sway, save where, in sheltered places, man has reclaimed some acres from the bog. Calcicole and light-soil plants are almost absent. Rare and interesting species are fewer than the position of the island and the nature of the ground might lead one to expect. Lake shores in the E. are crowded with *Eriocaulon septangulare*, and in the W. with *Ranunculus scoticus*. *Lobelia Dortmanna* is common in most of the low-level lakes; *Isoetes lacustris* is rarer. Keel L. (Loċ Caol (?), narrow lake (?)) is full *of Potamogeton nitens* and *P. filiformis*; and *Mimulus guttatus* has found its way here. Wet bogs yield abundance of *Hypericum elodes*, *Drosera intermedia*, *Utricularia intermedia*, *Carex limosa*. *Lycopodium inundatum* occurs near Sraheens Lough. *Saxifraga umbrosa* and *Lastrea æmula* are all over the island at all elevations. *Erica mediterranea* is widely but locally distributed, chiefly along the edges of streamlets and lakes. As one ascends the hills, *Arctostaphylos Uva-ursi*, *Juniperus nana*, and the two Filmy Ferns come in—the last-named chiefly in holes among the rocks and boulders. Higher up, on Slievemore and Croaghaun, are *Saxifraga stellaris*, *Salix herbacea*, *Listera cordata*, *Carex rigida*. The scarp below the summit of Slievemore yields in addition *Epilobium angustifolium*, and abundance of *Oxyria digyna* and *Cystopteris fragilis*. The grand precipice of Croaghaun is quite poor in its flora, but the interesting Shetland var. *procumbens* of *Hypericum pulchrum* is frequent; and another north Scottish plant, *Euphrasia Foulaensis*, grows on the summit. On Achill Head *Cochlearia grœnlandica* may be gathered, and near by the Maidenhair, *Adiantum Capillus-Veneris*, grows in an almost inaccessible station. The low sea-cliffs in the north are hung with *Sedum Rhodiola*. The introduced flora is quite limited. The American *Matricaria discoidea* grows on roadsides at the Sound; and *Geranium pratense* has naturalized itself in a meadow at Dugort. Among Brambles, the local western species *Rubus cariensis* is abundant at Dugort, and *R. iricus* and *R. dunensis* occur at the same place.

R. Ll. Praeger: The Flora of Achill Island. *Irish Nat.*, xiii., 265–289. 1904.

THE COUNTY OF SLIGO.

Co. Sligo (Sligeaċ, shelly place) is a region of high botanical interest, and contains much beautiful scenery. Area 721 square miles. Three types of ground and of vegetation are conspicuous. The S. part, from L. Gara to Collooney and Tobercurry (Tobar an Ċoire, the well of the caldron), is typical Central Plain country—flattish, drift-covered, limestone ground—consisting mainly of pasture, with some bog, marsh, and esker-ridges, and a good many lakelets. In the NW. the limestone rises into a high cliff-walled plateau, from 1000 to over 2000 feet in elevation



CROAGHAUN, ACHILL ISLAND,
Showing the seaward face, 2192 feet in height.

James Grierson, Photo. *To face p.* 94.

(see Ben Bulben Plateau, p. 97); and these uplands are continued into the SW. in the form of isolated terraced limestone hills of over 1000 feet in height (see Keshcorran and Carrowkeel, p. 99). While the flat tops of the hills are covered with bog, supporting a calcifuge heath vegetation of ordinary type, their wall-like sides and talus-slopes are tenanted by a remarkable alpine and calcicole vegetation. Lastly, in the west, one of the great 'Caledonian' folds throws up the ancient metamorphic floor of the country as a wide range of bare bog-smothered hills, rising to over 1700 feet (see Ox Mountains, p. 100), with a few alpine plants included in their calcifuge vegetation. This fold continues across the county in the range of low rocky hills that passes Collooney (Cúil Ṁaoile (Annals), Cúil Ṁúine (spoken), corner of Maol (?) or Múine (?)), and overlooks the southern shore of L. Gill. In the SW. a portion of the coal-field of Leitrim lies within the county, and forms the long, bare sandstone ridge of Bralieve (Ḃreaġṡliaḃ (?), fine mountain, 1498 feet). There are several considerable lakes. The lovely L. Gill lies close to the town of Sligo, between the metamorphic and the limestone ranges. L. Arrow, also a beautiful lake, and the bare L. Gara, lie in the SE. (p. 75). The extensive coast-line is irregular, generally rocky, with some sandy beaches, and several large, almost land-locked, sandy inlets. The only important island is Inishmurray (p. 99), a mile in length, lying well out in the Atlantic, and famous for its early Christian remains and its primitive customs.

Flora 655 species. *Arenaria ciliata* has here its only station in the British Isles; and *Saxifraga nivalis* its only Irish station. Most of the other rarer plants are, like these, inhabitants of the limestone cliffs of the Ben Bulben range:—*Silene acaulis, Hieracium hypochæroides, Euphrasia Salisburgensis, Polygonum viviparum, Sisyrinchium angustifolium, Poa alpina, Adiantum Capillus-Veneris, Aspidium Lonchitis, Polypodium Dryopteris.*

SLIGO TOWN.

The flourishing little town of Sligo (Sligeaċ, shelly place) is surrounded by a district unsurpassed for beauty in Ireland, and of very high botanical interest. It is chiefly known to the botanist as a base for the exploration of the Ben Bulben limestone hills, with their profuse alpine flora (see The Ben Bulben Plateau, p. 97). L. Gill also, which lies close to the town, is equally attractive to the lover of botany and of the picturesque (see Lough Gill, p. 96). Knocknarea and Rosses Point, referred to below, also lie close at hand. The knobby metamorphic hills which form the continuation of the Ox Mountains pass within a few miles of the town. The botany of the immediate vicinity of Sligo calls for no remark: *Potamogeton Zizii*, in the Garvogue River (An Ġarḃóg, the little rough thing), is the best plant found within the municipal boundary.

LOUGH GILL.

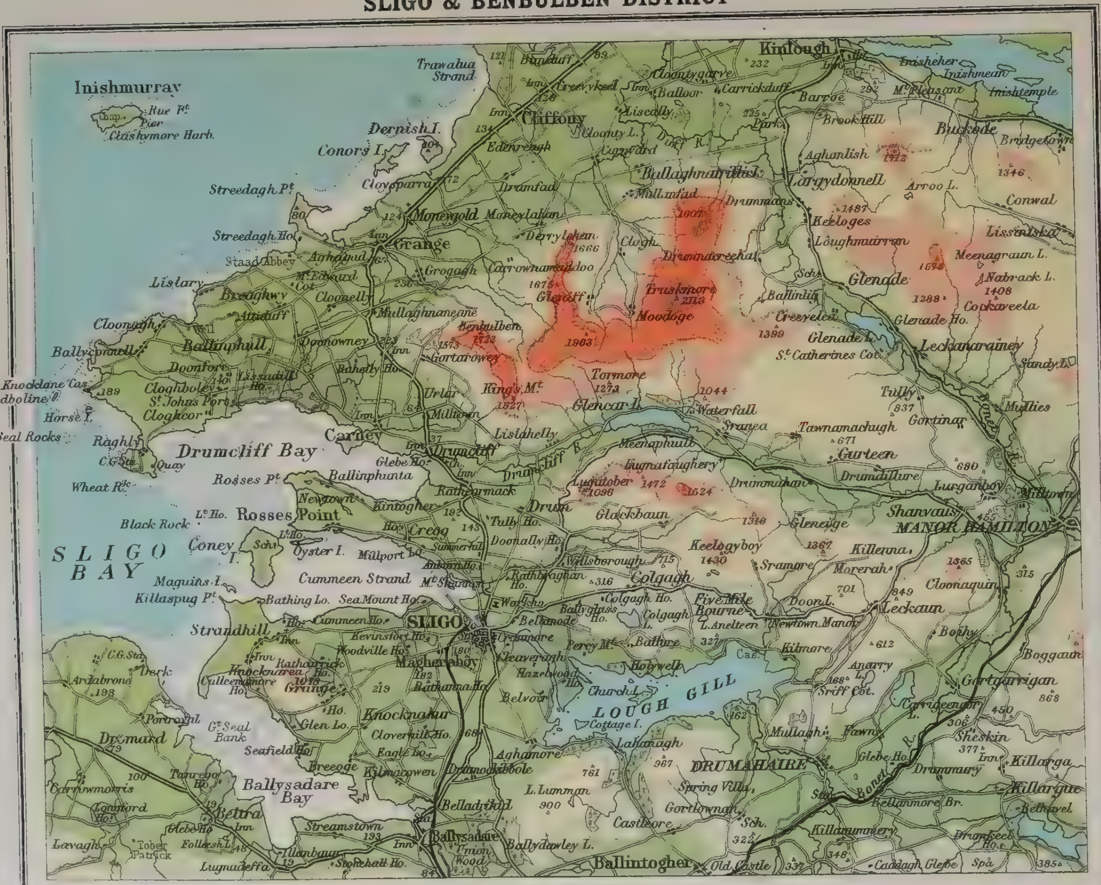
Lough Gill (Loċ Gile, lake of brightness) is an exquisite lake, lying between the limestone mountains of the Ben Bulben range and a ridge of heathery gneissose hills representing a very ancient fold of "Caledonian" age. Length 5 miles, breadth 1 to 2 miles. The shores and islands are beautifully wooded, and it is chiefly in the woods that the botanist will reap his harvest. The flora includes *Circæa alpina* (abundant), *Hieracium stenolepis* (east end), *Pyrola media* (Hazelwood), *Monotropa Hypopithys* (at Doonee Rock and Hazelwood), *Neottia Nidus-avis* (frequent), *Orobanche Hederæ*, *Polypodium vulgare* var. *cambricum*, and on the gneiss *Festuca sylvatica*, *Lastrea æmula*, *L. Oreopteris*, and both the Filmy Ferns. *Tamus communis* is naturalized in the woods. L. Gill lies close to Sligo, and from the town one rows up the River Garvogue (An Ġarḃóg, the little rough thing) into the lake.

The east end of L. Gill, which lies in Leitrim, is also very beautiful. Limestone bluffs overhanging the lake yield *Taxus baccata*, *Cornus sanguinea*, and *Orobanche Hederæ*, and the woods *Agrimonia odorata*. *Lysimachia Nummularia* grows at the mouth of the Bonet River (An Ḃuanaid, lasting river), up which one may row to **Dromahaire** (Druim Dá Eiṫiar, the ridge of the two air-demons), with its interesting ruins and snug little hotel.

ROSSES POINT.

Rosses Point (Na Rosa, the promontories) is a pleasant seaside resort, with several little hotels, on a small low peninsula 5 miles NW. of Sligo. The sands, knolls, and sea-rocks yield a flora in which plants of various types of distribution are mixed, as shown by the following list:—*Papaver hybridum*, *Draba incana*, *Saxifraga aizoides*, *Chlora perfoliata*, *Orobanche rubra*, *Juniperus nana*, *Ophrys apifera*, *Carex muricata*, *Sesleria cærulea*, *Adiantum Capillus-Veneris*, all of which occur within a few feet of sea-level. Frequent long cars from Sligo; and steamers also run.

SLIGO & BENBULBEN DISTRICT



The Edinburgh Geographical Institute

J. G. Bartholomew.

English Miles

0 1 2 3 4 5 6

THE BEN BULBEN PLATEAU.

One of the most interesting and beautiful districts in Ireland. It may be defined as stretching from L. Gill to L. Melvin, and from near the sea to Manorhamilton, where it adjoins the L. Allen hills or Connaught coal-field described below (p. 101). It takes its name, Ben Bulben (beann Gulban, the peak of Gulba), from the prominent western spur which stands out grandly N. of Sligo. The district lies half in Sligo and half in Leitrim, and covers about 200 square miles. The Carboniferous limestone here forms a plateau 1000 to 2000 feet above the surrounding country. In places, as on the highest point, Truskmore (Trosg Mór, great cod (?), 2115 feet), the limestone is still capped by the wreck of the Millstone Grit. In the N., dissection has proceeded apace, and sloping hill-sides are common; but the main mass remains, intersected by two splendid cliff-walled valleys—Glencar (Gleann Ċairṫe, glen of Cairthe or (?) pillar-stone) running E. and W., and Glenade (Gleann Éada, glen of jealousy) running SE. and NW. Each of these valleys embosoms a pretty lake. To the western ocean also the plateau presents a glorious precipitous front, subtended by a stretch of arable land. The typical succession of the district is—(1) flat hill-tops covered by thick peat, with bog and heath formations; (2) limestone cliffs with taluses, or slopes, with alpine plants and grass; (3) drift-covered arable land.

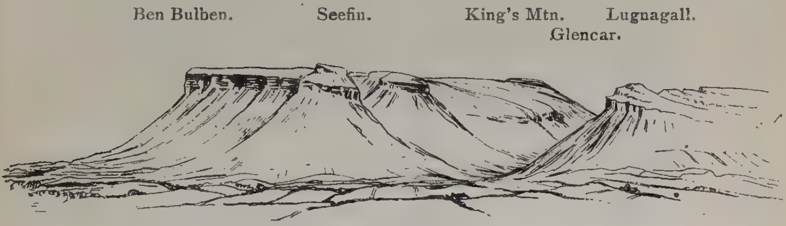


Fig. 13.—Ben Bulben from the south.
After a sketch by A. B. Wynne.

The remarkable feature in the vegetation is the alpine character of the flora of the limestone escarpments. *Arenaria ciliata*, which has here its only Britannic station, is a plant with a high northern and alpine distribution. *Saxifraga nivalis*, and also *Epilobium alsinefolium*, which grows on the Leitrim part of the Ben Bulben range, are alpine species which have here their only Irish habitat. On the escarpments there occur in profusion—*Draba incana*, *Dryas octopetala*, *Saxifraga aizoides*, *S. hypnoides*, *Sedum Rhodiola*, *Asplenium viride*. More locally abundant are—*Silene acaulis*, *Polygala grandiflora*, *Arenaria ciliata*, *Saxifraga oppositifolia*, *Circæa alpina*, *Euphrasia Salisburgensis*, *Oxyria digyna*, *Salix phylicifolia*, *Sesleria cærulea*, *Aspidium Lonchitis*; while the following may be classed as rare—*Meconopsis cambrica*, *Vicia sylvatica*, *Hieracium hypochæroides*, *H. ciliatum*, *Vaccinium Vitis-Idæa*, *Thymus Chamædrys*, *Polygonum viviparum*, *Salix herbacea*, *Juniperus nana*, *Carex rigida*, *Poa alpina* (second Irish station). Two alpines, *Thalictrum alpinum* and *Saxifraga nivalis*, are confined to Annacoona; while in Glenade, inside the County Leitrim boundary, grow *Arabis petræa* (second Irish station) and *Epilobium alsinefolium*. The most interesting alpine ground will be found on the cliffs of Annacoona (Áṫ na Cúinne (?), the ford of the corner (?)), which may be reached from the S. by crossing the plateau from Glencar L., or from the N. by Gleniff (Gleann Ḋuiḃ (?)), *via* Ballaghnatrillick (Bealaċ na Trí Liag, road of the three pillar-stones); and on the cliffs which lie W. of Glenade L.

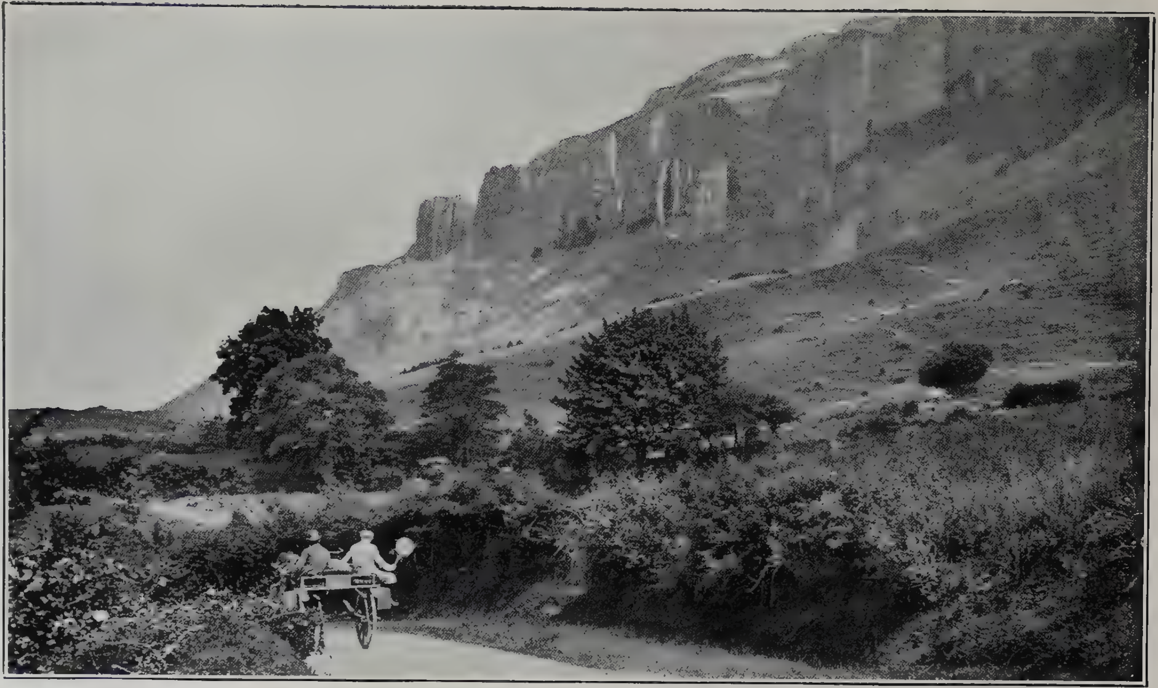
The valleys and the skirts of the mountains also yield some interesting species. *Equisetum trachyodon* grows near Glencar L., *Sisyrinchium angustifolium* at the entrance of Glencar, *Pyrola minor* near Lurganboy (An Lurgain Buiḋe, the yellow shin), *Drosera intermedia* and *Rhynchospora fusca* on bogs in the N. On low limestone rocks on the coast, in several places, *Adiantum Capillus-Veneris* grows. Other seaside plants of the district are *Trifolium fragiferum*, *Cuscuta Trifolii*, *Chenopodium rubrum*, *Elymus arenarius*.

The Ben Bulben district may be worked from Sligo or Bundoran (Bun Doḃráin, mouth of little water), which are well provided tourist centres, or from Manorhamilton.

R. M. BARRINGTON and R. P. VOWELL: Report on the Flora of Ben Bulben and the Adjoining Mountain Range in Sligo and Leitrim. *Proc. Roy. Irish Acad.*, 2nd ser., Science, iv., 493–517. 1885. R. LL. PRAEGER: Phanerogamia and Pteridophyta [of Sligo Field Club Conference]. *Irish Nat.*, xiii., 204–208. 1904.

Knocknarea (Cnoc na Riaġaḋ, the hill of the executions), the great flat-topped hill which rises over the sea 4 miles W. of Sligo, is an outlier of the Ben Bulben limestone plateau; its cliffs yield a reduced alpine flora, including *Draba incana*, *Saxifraga hypnoides*, *Asplenium viride*, *Sesleria cærulea*. The extensive sand-dunes at Strandhill are barren as regards rare plants, like most of the western dunes. Knocknarea Glen,

PLATE 15.



ENTRANCE OF GLENCAR, CO. SLIGO.

R. Welch, Photo.

To face p. 98.

situated at the southern base of the hill, a curious cliff-walled rift in the limestone, is well worth a visit for the remarkable luxuriance of its fern vegetation. Hart's-tongues grow 3 to 4 feet long here, with *Festuca sylvatica*. About the muddy head of **Ballysadare Bay** (baıle Eaꞅa Daꞃa, the town of the cascade of the oak), which adjoins on the south, one may find *Scirpus rufus*, *Potamogeton flabellatus*, *Ruppia rostellata*.

KESHCORRAN AND CARROWKEEL.

These two hills, lying W. of L. Arrow, form an important outlier of the limestone range of Sligo. Though they are twenty miles S. of Ben Bulben, Knocknarea forms a connecting link, and all their plants are familiar Ben Bulben species. Keshcorran (Ceıꞅ Ċoꞃaınn, the wicker bridge of Corrann, 1163 feet), which rises boldly from the plain near Ballymote, is a dome with a conspicuous low cliff on its SW. side, pierced by a row of caves in which many bones of Bears and other extinct animals have been found. *Cornus sanguinea* is on the cliff; about the summit are *Draba incana*, *Saxifraga hypnoides*, *Cystopteris fragilis*, *Asplenium viride*, *Cerastium tetrandrum*. Carrowkeel (An Ceaṫꞃaṁa Ċaol, the narrow quarter), which adjoins on the east and looks down on L. Arrow, is a curious hill, with a flat top traversed by parallel cliff-walled rifts, and dotted with prehistoric carns. It has yielded *Meconopsis cambrica*, *Draba incana*, *Saxifraga hypnoides*, *Epilobium angustifolium*, *Hieracium stenolepis*. The visitor to this region can stay conveniently at Ballymote (baıle an Ṁóꞇa, the town of the moat) or Boyle.

INISHMURRAY.

Inishmurray (Inıꞅ Muıꞃeaḋaıġ, Muireadhach's island), famous for its early Christian remains, offers no special attraction to the botanist. The island lies three miles off the north Sligo coast, and is about ½ sq. m. in area. It consists of a low reef of Carboniferous sandstone, with a thin boggy covering. *Lythrum Salicaria* is the most conspicuous species, occurring in vast profusion; *Osmunda regalis* forms large masses; *Habenaria bifolia* and *Orchis maculata* are abundant. *Asplenium marinum* grows among boulders. *Brassica alba* is the commonest weed of tillage. *Radiola linoides* and *Peplis Portula* are among the many calcifuge species. A form of *Juncus effusus* with stems spreading in all directions occurs. An hour's work yielded a list of 145 species.

R. Ll. Praeger: The Plants of Inismurray, Co. Sligo. *Irish Nat.*, v. 177–8. 1896.

THE OX MOUNTAINS AND SLIEVE GAMPH.

One of the ancient "Caledonian" folds which have been referred to elsewhere. In the centre of this great anticline, from L. Cullin in Mayo to Collooney in Sligo, the ancient metamorphic rocks rise into a dark forbidding ridge, the highest point being Knockachree (Cnoc a' Ċraoi, the hill of the hut, 1778 feet), near the E. end. The ridge is mostly broad and smooth, about 1600 feet elevation, and for miles the summit is occupied with deep flat spongy bog. Steep slopes are rare, and high cliffs do not occur. Lakes, mostly quite small, are numerous. Native wood is almost absent. The scenery about L. Talt is picturesque; elsewhere it is rather monotonous. The flora is poor. *Rubus saxatilis*, *Saxifraga aizoides*, *Hieracium iricum*, *Vaccinium Vitis-Idæa*, *Salix herbacea* occur, mostly about Knockachree. *Polypodium Phegopteris* is abundant in one place near the east end of the hills, and *P. Dryopteris* has one of its few Irish stations near L. Talt. *Equisetum variegatum*, *Lycopodium clavatum*, and *Epipactis palustris* grow by L. Talt, and *Prunus Padus* by L. Achree. The W. part of the range is known as Slieve Gamph (Sliaḃ Ġaṁ, winter mountains), and lies in Mayo. Here the hills are lower. A fine cliff overlooks the valley and lakelets of Glendaduff (Gleann Ḋá Ḋuḃ, the glen of two black things), and furnishes the only East Mayo station for *Saxifraga umbrosa*. By the sea-shore at the foot of the Ox Mountains, near Dromore West (Druim Mór, great ridge), *Adiantum Capillus-Veneris* grows on limestone rocks.

The Ox Mountains occupy a tract of somewhat remote and primitive character, and are best worked from Dromore West, where a good little hotel will be found, from Ballina, near the W. extremity of the range, or from Collooney or Sligo at the E. end.

N. Colgan: On the Flora of the Ox Mountains, Co. Sligo. *Irish Nat.*, v. 301–308. 1896.

THE COUNTY OF LEITRIM.

Leitrim (Liaṫdruim, grey ridge) is a long narrow county of 613 square miles, extending from the Atlantic into the centre of Ireland, and offering three distinct types of rock, of scenery, and of vegetation. In the N., half of the Ben Bulben range belongs to the county. Here we have imposing cliff-walled limestone mountains, their summit forming a heathery bog-covered plateau, their sides clothed with alpine and calcicole plants. In the middle of the county, where L. Allen cuts it nearly in two, high hills rise (Slieveanieran, 1922 feet) formed of Upper Carboniferous sandstones and shales, with seams of coal—a region of dark heather and clay-lands, with a rather poor and calcifuge flora. The S. part of the county is low-lying, consisting of ridges of the impure Lower Limestone, with hollows between filled with bog and lake; while the aquatic vegetation is here tolerably rich, the flora is on the whole uninteresting.

In the N. the beautiful valley of Glenade provides quite a botanical paradise (see GLENADE, p. 103); and the county boundary near by crosses the summit of Truskmore (2113 feet), the highest point of the Ben Bulben range (see BEN BULBEN PLATEAU, p. 97). L. Allen in the centre, the highest of the Shannon lakes, is a large sheet of water, being 9 miles in length. Its shores are rather bare, like the hills which surround it (see CUILCAGH and SLIEVEANIERAN, *infra*). The southern district, with its innumerable lakes and low ridges and bogs, conveys the impression of a water-logged country (see SOUTH LEITRIM, p. 102). The Shannon, rising on the hills a few miles outside the county boundary, flows through L. Allen, and almost at once assumes the lake-like sluggish course which characterizes it; and in this guise it flows along the W. edge of the area. Portions of two beautiful Sligo lakes, L. Gill and Glencar L., infringe the western boundary of the county (see LOUGH GILL, p. 96); and in the north L. Melvin, 8 miles in length, belongs mainly to Leitrim (see LOUGH MELVIN, p. 103). About three-fifths of the county are under grass, and one-fifth under crops. The sea-coast, in the extreme NW., consists of 3 miles of low rocky shore, with very few maritime plants.

Flora 564 species—a comparatively small total, due partly at least to insufficient working. Botanical interest centres in the limestone hills in the north. Here *Epilobium alsinefolium* has its only Irish station; and most of the rarer plants of the county, enumerated below, are found there:—*Arabis petræa*, *Silene acaulis*, *Euphrasia Salisburgensis*, *Teucrium Scordium*, *Adiantum Capillus-Veneris*, *Aspidium Lonchitis*, *Polypodium Dyopteris*.

CUILCAGH AND SLIEVEANIERAN.

Around L. Allen in Leitrim, and stretching thence to L. Macnean, a mass of shales and sandstones of the Yoredale series, capped in the south by Coal-measures, rests on the limestone, and forms an imposing hill-mass. The main ridge runs NE. from the E. shore of L. Allen, from Slieveanieran, 1922 feet, overlooking that lake, to Cuilcagh (2188 feet) on the borders of Cavan and Fermanagh; other mountains of less elevation are grouped west and north of L. Allen. Cuilcagh (Cuilceaċ, reeds (?), pronounced Kultsha) presents an imposing scarp of sandstone facing NNE. for two miles, but is singularly poor in mountain plants, as are the other hills within this area. *Cryptogramme crispa* has been found on Cuilcagh; also *Vaccinium Vitis-Idæa* and *Hymenophyllum unilaterale*, the last being frequent in this region. The Slieveanieran district (Sliaḃ an Iarainn, the mountain of iron) is gloomy, with wet pastures and boggy heaths, giving way, as one ascends, to shaggy heather. *Listera cordata* occurs, and *Hieracium vulgatum*. The Arigna hills (Airgne (?), plunderings), on the W. shore of L. Allen, yield bands of hæmatite and coal, which were more extensively worked formerly than now.

Lough Allen, lying between Slieveanieran and Arigna, is a large and rather desolate sheet of water, pear-shaped, 9 miles in length, covering 14 square miles, and elevated 160 feet above the sea. The River Shannon, rising to the east of Cuilcagh, falls with a rapid course into the upper end of the lake, and leaves the lower end as a deep slow-flowing stream. The flora of L. Allen is poor, but includes *Cicuta virosa*, *Polygonum minus*, *Carex aquatilis*, *Isoetes lacustris*, *Chara contraria*, *Nitella flexilis*.

All parts of the region are rather inaccessible. Belcoo is the best base for Cuilcagh, and Carrick-on-Shannon for L. Allen.

S. A. STEWART: Report on the Botany of Lough Allen, and the Slieveanieran Mountains. *Proc. Roy. Irish Acad.*, Ser. 2, iv. (Science) 426–442. 1885.

SOUTH LEITRIM.

South of Slieveanieran and L. Allen, the S. half of Co. Leitrim extends, a low, undulating area, composed mainly of tilled ridges formed of drift overlying impure limestone, with intervening hollows filled with bog or occupied by lakelets. In the extreme S., the narrow, alternating parallel tracts of farmland and of bog or lake give the country a quite peculiar aspect. The Shannon, more like a winding lake than a river, pursues a sinuous course along the W. edge of the district, fringed with great beds of reeds, and marshy meadows; and innumerable other sheets of water, of every size and shape, are found throughout the area. *Cicuta virosa* and many commoner marsh plants are frequent here, and the two Siums are recorded from Carrick-on-Shannon, near which place also *Potamogeton filiformis* and *Hydrocharis Morsus-ranæ* occur—the last also at Rinn Lough (Loċ Airinn). *Teucrium Scordium* has its most northern Irish station on the Shannon banks at Roosky (Rúsgaċ, marsh); *Fumaria densiflora* occurs at Mohill (Maoṫail Manaċáin, Manachán's spongy land). In the bogs *Rhynchospora fusca*, *Drosera intermedia*, and other characteristic species are common. *Polygonum minus* is abundant by Garadice L. (Loċ Ġarrḋa Déar (?), the lake of the garden of ears of corn (?)).

Towns are few and small in this area. Carrick-on-Shannon (Carraig, a rock) forms the best centre for the visitor, or he can stay at Ballinamore (Béal an Áṫa Móir, the mouth of the great ford).

MANORHAMILTON AND GLENADE.

Manorhamilton forms an excellent base for the exploration of Glenade and Glencar, the two magnificent cliff-walled valleys that intersect the limestone plateau of Ben Bulben. These valleys are somewhat similar—each about 1000 feet deep and a mile wide, each with a pretty lake lying between its grey rock-walls, with patches of wood to relieve the sternness of the massive cliffs. The low grounds in Glenade (Gleann Éada, glen of jealousy) have yielded *Pyrola minor*, *Polygonum mite*, *Equisetum hyemale*; *Salix pentandra* is abundant; but interest centres in the flora of the cliffs which face N. beyond Glenade Lake. Here *Epilobium alsinefolium* grows abundantly in its only Irish habitat, and *Arabis petræa* has its second station in the country. Most of the following are frequent or abundant—*Draba incana*, *Polygala vulgaris* var. *grandiflora*, *Silene acaulis*, *Dryas octopetala*, *Circæa alpina*, *Saxifraga oppositifolia*, *S. aizoides*, *S. hypnoides*, *Epilobium angustifolium*, *Euphrasia Salisburgensis*, *Oxyria digyna*, *Polygonum viviparum*, *Asplenium viride*, *Aspidium Lonchitis*. *Polypodium Dryopteris* has been found on Benbo (Beann Bó, cow's peak). Glenade may also be easily approached by its other end, from Bundoran or Kinlough (Cinn Loċa, head of lake). The hills lying on other sides of Manorhamilton are not so well known, but they are less rich as regards flora and scenery than the region about Glenade and Glencar. The country all about is hilly and interesting; and L. Gill, L. Melvin, and L. Macnean all lie within striking distance (6 to 8 miles), and invite exploration.

LOUGH MELVIN.

Lough Melvin (Loċ Meilġe)—famous for its fishing—has not been very thoroughly explored botanically. It is a pretty lake, 8 miles by about 1½ wide, lying on the Carboniferous limestone mainly in Co. Leitrim, partly in Fermanagh, and containing a number of islands, mostly planted with trees. The interesting Ben Bulben area of limestone mountains adjoins immediately on the SW. The E. end of the lake is the most interesting part. A small islet here (Gorminish of one-inch map) is the only Irish station outside Donegal for the Globe-flower, *Trollius europæus.* At Garrison *Potamogeton filiformis* is abundant on a shallow sandy bottom, and again at the mouth of the Glenaniff River (Gleannán Duiḃ (?)); *P. Zizii* also occurs. There is a little fishing hotel at Garrison (Garasdar, a garrison), and the lake is within easy reach of Bundoran.

THE COUNTY OF FERMANAGH.

Fermanagh (Fir Ṁanaċ, the men of the Menapii (Manaigh)) might be defined as occupying the lower two-thirds of the basin of the Erne (Eirne). This river, having previously flowed through the mazy lakes of L. Gowna (Loċ Gaṁna, the lake of the yearling calf) and L. Oughter (Loċ Uaċtair, upper lake), enters the county at its SE. end, spreads out into first one and then a second great island-filled expanse of water (Upper and Lower Lough Erne), and at the NW. end of the county plunges down to meet the Atlantic a few miles further on, below Ballyshannon (Béal Áṫa Seanaiġ, the ford-mouth of Seanach). On the upper lough drift prevails, and the islands and promontories are largely grazed or farmed. The lower lake is more open and wilder, with many rocky or wooded islands, and a more interesting flora (see LOUGH ERNE, p. 105). L. Macnean and L. Melvin, on the SW. edge of the county, are the only other important lakes (see LOUGH MACNEAN, p. 105, and LOUGH MELVIN, p. 103). All of these lakes occupy troughs in the limestone; but the surrounding country is formed largely of other materials. Heathery hills of metamorphic rocks fringe Lower L. Erne in the NW., and of Old Red Sandstone in the NE.; while SW. of Lower L. Erne, between it and L. Macnean, Yoredale sandstones overlying the limestone form a high moorland, with heathery hills which stretch southward, culminating in Cuilcagh (2188 feet) on the borders of Fermanagh and Cavan, and continuing across Leitrim to L. Allen and Slieveanieran (see CUILCAGH and SLIEVEANIERAN, p. 101). Fringing the sandstone hills are others of limestone, with a characteristic flora.

The county approaches to within a few miles of the Atlantic in the west. Area 714 square miles, of which three-fifths are under grass, and a quarter under crops. Low-level bogs are very few, and, except in the hill-regions, the aspect of the country is rich and prosperous. Enniskillen, built on an island in the Erne between the two great lakes, forms an excellent centre for the visitor, whether he explore on land or by boat.

Flora 591 species. The best plants are scattered as regards their habitat, the only focus being the hills near Derrygonnelly, which yield a northern group. The rarer plants include—*Ranunculus scoticus*, *Trollius europæus*, *Caltha radicans*, *Galium Cruciata*, *Pyrola secunda*, *Hypopithys multiflora*, *Euphrasia Salisburgensis*, *Sisyrinchium angustifolium*, *Stratiotes aloides*, *Carex elongata*, *Cryptogramme crispa*, *Equisetum pratense*.

LOUGH MACNEAN.

Upper and Lower Lough Macnean (Loċ Ṁic an Éin, the lake of the bird's son) lie close together, with the village of Belcoo between them. The upper lake is 5 miles long, the lower 3 miles. Both are most picturesquely situated among hills. They drain eastward into the Erne. Very few plants are recorded from their shores or waters: *Rosa involuta* and *Potamogeton nitens* have been found at the lower lake.

Florencecourt, the seat of the Earl of Enniskillen, is a fine demesne on the south side of the lower lake. Its limestone caves have made it long a place of resort for tourists, and a good many rare plants have been found. *Hieracium tridentatum* has here its only Irish station. The woods yield *Carex strigosa*, *C. pendula*, *Epipactis latifolia*. On the hills above grow *Listera cordata*, *Asplenium viride*, and both the Filmy Ferns. Bogs on the low grounds contain *Drosera anglica*, *D. intermedia*, *Rhynchospora fusca*.

The neighbouring villages of Blacklion and Belcoo (Béal Coḃa (?)) offer hotel accommodation to the visitor.

LOUGH ERNE.

This great lake, which lies along the centre of Co. Fermanagh for a distance of nearly 40 miles, is constricted near the middle for a distance of 8 miles into a river-like form, so that two tolerably distinct areas of water, Upper and Lower Lough Erne (Eirne), result. The **Upper Lake** is 10 miles long by 1 to 3 miles wide, 151 feet above the sea, filled with islands, points, and bays till it becomes a maze of land and water, like L. Oughter and L. Gowna, some miles further up the Erne River. The basin is formed of Carboniferous limestone. The land is everywhere drift-covered, mostly tilled or grazed, sometimes well wooded as at Belleisle and Crum Castle (Crom, crooked or winding place). The flora as a whole possesses no special feature; but some very interesting plants occur. The best are *Sisyrinchium angustifolium*, which grows on the promontory of Derryvore opposite Crum Castle, and *Carex elongata* at Crum, where *Stratiotes aloides* has an old-established headquarters. *Cicuta virosa* and *Neottia Nidus-avis* also grow. *Nasturtium sylvestre* has its only Ulster station at Belleisle, where *Lathyrus palustris* is also found. *Viola Curtisii* has one of its few Irish inland stations by the lake at Lisnaskea (Lıoꞅ na Sᵹıaċ, the fort of the whitethorn). The visitor to the upper lake may stay at Enniskillen or at Lisnaskea.

The **Lower Lake** is larger, more open, and in places high ground adjoins. It lies 149 feet above sea-level, is nearly 20 miles long by up to 5 miles wide, full of wooded islands in the upper part, broader and open below, where on the southern shore the limestone cliffs of Shean North (the northern end of the very interesting uplands described on p. 107) rise to over 1000 feet above the lake. Its basin is composed mainly of limestone, but in the upper part the eastern shore is occupied by sandstones, partly of Yoredale, but chiefly of Old Red age. The ground is largely drift-covered. The scenery is more varied and picturesque than that of the Upper Lake, and attains a high order of beauty, and the flora is more varied and interesting. Many wild-flowers display a profusion and luxuriance that are very striking. *Rhamnus catharticus*, *Circæa alpina*, *Galium boreale* are abundant members of the flora, of the islands especially. *Vicia sylvatica*, *Hieracium umbellatum*, *Gentiana Amarella*, *Mimulus guttatus*, *Polygonum minus*, *Centunculus minimus*, *Osmunda regalis*, occur more sparingly. *Caltha radicans* has one of its two Irish stations about Devenish (Daıṁınıꞅ, ox island), and *Potamogeton filiformis* grows at Kesh (Ceıꞅ, wicker-work bridge). On the smaller islands the woods are largely or entirely native (p. 17), and the flora undisturbed.

Hotels at Enniskillen, Rossclare (5 miles NW. of last), Pettigo, and at Belleek (béal Leıce, the mouth of the flagstone), where the Erne falls suddenly through a picturesque rocky gorge to reach sea-level near Ballyshannon.

The neighbourhood of **Ely Lodge** (Éıle, name of a territory), on the W. shore of the Lower Lough, has yielded good plants. *Hypopithys multiflora*, *Polygonum Bistorta*, *Ophrys apifera*, grow about the demesne. To the westward, limestone ridges with Hazel scrub rise from the lake-shore, where *Neottia Nidus-avis*, *Sesleria cærulea*, &c., are found.

R. M. BARRINGTON: Report on the Flora of the Shores of Lough Erne. *Proc. Roy. Irish Acad.*, ser. 2, iv. (Science), 1–24. 1884.

R. LL. PRAEGER: In Camp on Lough Erne. *Irish Nat.*, i., 110–114. 1892.

ENNISKILLEN.

The bright busy little town of Enniskillen (Inıꞅ Ceıꞇleann, Ceitle's island) is built on an island in the River Erne, between the great lake-expansions of Upper and Lower Lough Erne, and it forms a very convenient centre for the exploration of these waters. In summer a steamer runs on the lower lake, and open boats are to be had in abundance. Railways going in three directions assist the explorer. The surrounding country is undulating and fertile, with many lakelets and deep marshes. The limestone cliffs of Belmore Mountain (Ḃéal Móꞃ, great mouth), lying 6 miles westward, and the woods and hills at Florencecourt, situated about the same distance to the south-west, are excellent ground for the botanist (see FLORENCECOURT, p. 105). In the immediate neighbourhood of Enniskillen *Sium latifolium* has its Lough Erne head-quarters. *Veronica peregrina* occurs. *Caltha radicans* flourishes on the river-banks from Enniskillen to the island of Devenish, and has no doubt a wider range.

THE POULAPHUCA AND CARRICK DISTRICT.

Between Lough Macnean and Lower Lough Erne, and W. of Derrygonnélly (Ḋoıꞃe Uí Ḋonnᵹalaıᵹ, the oakwood of O'Donnelly), an interesting hill-country extends, formed mainly of Yoredale sandstone and Upper Carboniferous limestone. The sandstones dip S., so that while they fringe the shores of the former lake they overlook Lough Erne from a height of 1000 feet or more (Shean North (Sıaḋán) 1135 feet)) perched on the top of imposing cliffs of limestone. The limestone fringes the whole area, and forms green foot-hills with lakes between, and grey cliffs and grassy slopes, around the dense heather which clothes the sandstone moors. The sandstone on the higher grounds protrudes through the peaty covering in a series of E. and W. scarps, often with lakes at their bases; these parallel scarps run in straight lines for considerable distances, and are backed by long dip slopes. A large number of rare northern plants haunt both the limestone and the sandstone, the scarps of the latter in particular. The most interesting spots on the limestone area are the cliffs of Poulaphuca (Poll a' Ṗúca, the sprite's hole, cave, &c.) overlooking L. Erne, the vicinity of Carrick Lake (Caꞃꞃaıᵹ, a rock), and the cliff-walled hill of Knockmore (Cnoc Móꞃ, big hill). *Saxifraga hypnoides*, *Circæa alpina*, *Hieracium anglicum*, *H. lasiophyllum*, *Euphrasia Salisburgensis*, *Taxus baccata*, *Sesleria cærulea*, and *Cystopteris fragilis* are frequent or abundant on the limestone. Poulaphuca yields in addition *Saxifraga aizoides*, *Sedum Rhodiola*, *Epilobium angustifolium*; and also *Dryas octopetala*, which is plentiful on Knockmore. About Carrick Lake are *Juniperus nana*, *Eriophorum latifolium*; at Bunnahone L. (bun na hAḃna, the river-foot) *Equisetum trachyodon* grows on the shore. Turning now to the moorland, the sandstone scarps, from 500 to 1100 feet elevation, yield *Meconopsis cambrica*, *Pyrola secunda* (in abundance), *P. media*, *P. minor*; *Vaccinium Vitis-Idæa*, *Listera cordata*, and *Asplenium viride*, in quantity; both Filmy Ferns, *Lastrea æmula* and *Equisetum pratense*. The moorland lakes are fringed with *Ranunculus scoticus*; *Lobelia Dortmanna* occurs sparingly. It is interesting to note that some conspicuously calcicole plants, such as *Sesleria cærulea*, *Arabis hirsuta*, and *Asplenium Ruta-muraria*, grow on the high sandstone scarps, far from limestone (see also p. 12).

One of the most charming spots in the district lies about **Carrick Lake**. The lake is situated on the junction of the limestone and the sandstone areas, affording a picturesque contrast of scenery and of vegetation. On the limestone of Carrick Hill, which rises steeply from its waters, grow *Euphrasia Salisburgensis* and other calcicoles. Running up from the west end of the lake is **Correl Glen**, a deep cut in the sandstone, in which a dense birch wood clothes masses of fallen rocks, deeply covered with moss. Here *Vaccinium Vitis-Idæa* creeps over stones and up tree-trunks at 400 feet elevation, and the Killarney Fern and both Filmy Ferns have been found amid the boulders, with *Pyrola secunda* on the low cliffs.

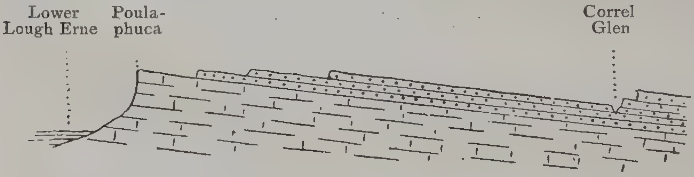


Fig. 13.—Diagrammatic Section across the Poulaphuca district; Upper Carboniferous Limestone, capped by Yoredale Sandstone. Length of section, 3 miles; height, 1,100. Direction, N. to S. (left to right of sketch).

No hotels lie within the district, but it may be worked from Enniskillen, Belleek, or Garrison.

R. Ll. Praeger: Among the Fermanagh Hills. *Irish Nat.*, xiii., 232–241. 1904.

INDEX TO PLACE-NAMES IN TOPOGRAPHICAL SECTION.

Principal references are distinguished by heavy type.

Achill Head, 94.
    Island, 81, 89, **92**.
    Sound, 86, 92, 94.
Adare, 43.
Allen, Lough, 73, 75, 97, 100, 101, **102**, 104.
Annacoona, 98.
Aran Islands, 45, 46, **54**.
Ardrahan, 51, 54, **57**.
    limestones, 56, **57**.
Arigna, 102.
Arra Mountains, 49, 59.
Arrow, Lough, 73, 75, **76**, 97, 99.
Askeaton, 40, **42**.
    limestones, 41, **42**.
Athenry, 61.
Athlone, **73**, 74, 75.
Atlantic, 45, 47, 51, 81, 104.
Ballaghaderreen, 77.
Ballaghnatrillick, 98.
Ballina, 81, **87**, 90, 100.
Ballinamore, 103.
Ballinasloe, 7, **72**.
Ballindooly, 72.
Ballinrobe, 79.
Ballycastle, 89.
Ballyconneely, 68.
Ballycuirke Lough, **62**, 64.
Ballyhaunis, 77.
Ballynahinch, 62, 65.
    Lake, 66.
Ballymote, 99.
Ballysadare Bay, 75, **99**.
Ballyshannon, 104, 106.
Ballyvalley, 49.
Ballyvaughan, 51, **54**.
Bangor, 86, **89**.
Barbersfort, 72.
Barna Head, 71.
Belcoo, 102, **105**.
Bellacragher Bay, 85.
Belleek, 106, 108.
Belleisle, 105.
Belmore Mountain, 107.
Belmullet, 89, **90**.
Beltra, Lough, 85.
Ben Bulben, 76, 95, 96, **97**, 98, 99, 100, 101, 103, 104.
Benbury, 82.
Benchoona, **67**, 69, 83.
Bengorm, 82.
Ben Lettery, 65.
Benlugmore, 82.
Bennabeola, 65.
Bilberry Island, 63.
Birreencorragh, 86.
Black Head, 51.
Blacklion, 105.
Blacksod Bay, 89.
Boderg, Lough, 73.
Bonet River, 96.
Boyle, **75**, 99.
    Lakes, 73, **75**.
Bralieve, 95.
Buckoogh, 86.
Bundoran, 98, 103, 104.
Bunowen, 68.
Burren, 42, 46, 50, **51**, 54, 57, 80.
Caher River, 51.
Cahir, 45.
Cannaver Island, 63.
Canova Island, 63.
Carrick Hill, 108.
    Lake, 107, **108**.
Carrick-on-Shannon, 102, 103.
Carrowkeel Mountain, 76, 95, **99**.
Carrowmore Lough, 81, **89**.
Carrowroe Park, 76.
Carra, Lough, 77, 78, **79**.
Castlebar, 77, 81.
Castleconnell, 43.
Castle Hacket, 72.
    Lambert, 61.
    Lough, **50**, 51.
Castlereagh, 76.
Castle Taylor, 57.
Cavan, County, 102, 104.
Central Plain, 56, 59, 73, 74, 75, 77, 78, 94.
Clare, Central, 42, 46, **50**, 51.

Clare, County, 42, **45**, 58, 59, 80.
  Island, 81, 90, **91**.
  River, 72.
Clare-Galway River, 71.
Claremorris, 77.
Cleggan, 70.
Clew Bay, 81, **84**, 85, 86, 92.
Clifden, 61, 66, 68, 69, 70.
Cliffs of Moher, 51.
Clonbrock, 72.
Clonbur, 61, **77**, 79.
Clonmacnois, 74.
Clooneigh River, 76.
Collooney, 94, 95, 100.
Comeraghs, 45.
Coney Island, 49.
Cong, 63, 64, **77**, 79.
Conn, Lough, 81, 86, **87**.
Connemara, 51, 54, **61**, 63, 81.
  South-west, 68.
Coolin, Lough, 78.
Coosan Lough, 74, 75.
Cooter, Lough, 56, **58**.
Cork, County, 40, 51.
Corofin, 48, **50**.
Corranroe, 50.
Correl Glen, 108.
Corrib, Lough, 61, 62, **63**, 64, 66, 67, 70, 72, 77.
Corrib, River, 71.
Corslieve, *see* Slieve Cor.
Craigga More Lough, 69.
Cratloe, 49.
Craughwell, 57.
Cregduff Lough, 69.
Croaghaun, 81, 92, **94**.
Croaghmore, 92.
Croaghpatrick, 81, **84**, 85.
Crossmolina, 87, 88.
Crum Castle, 105.
Crusheen, 48, 50, 58.
Cuilcagh, **101**, 102, 104.
Cullin, Lough, 81, **87**, 100.
Curlew Hills, 73, **75**.
Curra, Lough, 45.
Curragh Chase, 43.
Curraun Achill, 85.
Cushcamcarragh, 86.
Cutra, Lough, 58.
Dalystown, 58.
Derg, Lough, 45, 46, 49, 56, 58, **59**, 60.
Derryclare Lough, 66.
Derrygonelly, 105, 107.
Derryvore, 106.
Derryvunlam wood, 59.
Devenish, 106, 107.
Dog's Bay, 68.
Donegal, County, 104.
Doo Lough, 82.
Doonbeg, 47.
Dromahaire, 96.
Dromoland, 48.
Dromore West, 100.
Drumman wood, 88.
Dugort, 93.
Ely Lodge, 106.
Ennis, 46, **47**, 48, 50.
Enniskillen, 105, 106, **107**, 108.
Ennistymon, 51.
Erne, Lough, Lower, 104, **106**, 107.
    Upper, 104, **105**, 107.
  River, 104, 105.
Errew peninsula, 88.
Erriff River, 83.
Erris, 81, 86, **89**.
Fairhill, 77.
Feeagh, Lough, 81, 85, 86.
Fergus estuary, 44, 45, 46, 47, **48**, 50.
  River, 47, 48, 50.
Fermanagh, County, 102, 103, **104**.
Fisherstreet, 51.
Florencecourt, **105**, 107.
Foynes, 41.
Galey River, 41.
Galtees, 40, **45**.
Galtymore, 40, **45**.
Galway Bay, 46, 51, 54, 56, 57, 58.
  city, 54, 55, 61, 62, 63, 64, **71**.
  North-east, **70**, 77.
  South-east, 56.
  West, **61**, 78, 80, 81.
Gara, Lough, 75, **76**, 94, 95.
Garadice Lough, 103.
Garrison, 104, 108.
Garryland, 57.
Garvogue River, 96.
Gentian Hill, 71.
Gill, Lough, 95, **96**, 97, 101, 103.
Glancushnabinnian, 45.
Glenade, 45, 97, 98, 101, **103**.
  Lake, 98, **103**.
Glenaniff River, 104.
Glenastar, 41.
Glencar, **97**, 98, 103.
  Lake, **98**, 101.
Glencolumbkille, 51.
Glendaduff, 100.
Glendree, 49.
Gleniff, 98.

Glennamong, 86.
Glenstal, 44.
Glenummera, 82.
Gorminish, 104.
Gort, 49, 50, 56, **57**, 58.
Gowna, Lough, 104, 105.
Graney, Lough, **49**, 58.
Grange River, 72.
Gur, Lough, 43.
Hare Island, 75.
Inagh, Lough, 66.
Inchiquin Lake, 50.
Inishark, 70.
Inishbofin, 69, **70**, 91.
Inishcrone, 87.
Inisheer, 54.
Iniskea, 90.
Inishmaan, 54.
Inishmore, 54.
Inishmurray, 95, **99**.
Inishturk, 69, 70, 81, **90**.
Keel Lough, 94.
Kerry, County, 40, 51.
Kesh, 106.
Keshcorran, 76, 95, **99**.
Key, Lough, 73, 75, **76**.
Kilbeg ferry, 64.
Kilkee, 47.
Kilkelly, 75.
Killadysert, 49.
Killala, 81, **87**.
  Bay, 87.
Killaloe, **49**, 60.
Killery, 66, 67, 69, 81, 82, **83**.
Killinaboy, 50.
Killower Lough, 72.
Kilrush, 47.
Kinlough, 103.
Kinvarra, 57, 58.
Knockachree, 100.
Knockmae, 72.
Knockmealdown Mountains, 45.
Knockmore, 107.
Knocknarea, 95, **98**.
  Glen, 98.
Kylemore, 65, **67**, 69, 83.
Lanesborough, 74.
Leenane, 66, **83**.
Lehinch, 51.
Leitrim, County, 95, 96, 97, 98, **100**.
  South, 101, **102**.
Letterfrack, 66.
Limerick, City, 40, **42**, 44, 59, 77.
  County, **40**, 80.
  West, 40, **41**.
Lisdoonvarna, **51**, 52.
Lisnaskea, 106.
Lisoughter, 66.
Longford, County, 74.
Loop Head, 44, 46, **47**.
Loughrea, 56, 58, 59.
Loughty, 82.
Louisburgh, 92.
Lurganboy, 98.
Maam, 62, 66, **67**.
Maam Cross, 67.
Maamtrasna, 83.
Maam Turk, 62, 65, **66**.
Macnean, Lough, 101, 103, 104, **105**, 107.
Maigue, River, 43.
Mallaranny, **85**, 86, 87, 89.
Manorhamilton, 97, 98, **103**.
Mask, Lough, 77, **78**, 79, 81, 83.
Maumeen, 67.
Mayo, County, 62.
  East, 75, **77**, 100.
  West, 78, **80**.
Meenawn, 93.
Melvin, Lough, 97, 101, **103**, 104.
Menlo or Menlough, 71.
Minawn, *see* Meenawn.
Mitchelstown, 45.
Moher, Cliffs of, 51.
Mohill, 103.
Molreny, 85.
Monmor Bog, 46, **47**.
Mount Gable, 78.
Mountshannon, 58, 60.
Mount Trenchard, 41.
Moy, River, 87.
Moycullen, **62**, 64.
  limestones, 61, **62**, 63.
Moyne Abbey, 87.
Moyode, 61.
Muckanaght, 65.
Mullet, 89.
Mullough, 42.
Murrisk, 84.
Mweelrea, 81, **82**, 83, 84, 86.
Nafooey, Lough, 83.
Nenagh, 60.
Nephin, 81, 85, **86**, 88, 89.
Nephinbeg, 85, **86**, 89.
Newcastle, 41.
Newmarket, 49.
Newport, **84**, 87.
Oranmore, 57.
Oughter, Lough, 104, 105.
Oughterard, 61, 62, 63, **64**.

Owenbrin River, 84.
Owendalulleegh River, 58.
Ox Mountains, 77, 80, 87, 88, 95, 96, **100**.
Partry Mountains, 78, **83**.
Pontoon, 87, **88**.
Port-na-fedog, 68.
Portumna, 56, 59, **60**.
Poulaphuca, 107.
Rathkeale, 41.
Rea, Lough, 56.
Recess, 62, **66**.
Ree, Lough, 73, **74**, 76.
Reek, The, 84.
Renvyle, 66, **69**, 91.
Rinn Lough, 102.
Roadford, 51.
Rockforest, 50.
Rockingham, 76.
Roonah Quay, 92.
Roosky, 103.
Roscommon, County, **73**, 77.
  town, 76.
Rossclare, 106.
Rosses Point, 95, **96**.
Ross Lake, **63**, 64.
Roundstone, 66, 68, **69**.
Salruck, 68.
Scarriff, 49, 58, 60.
  Bay, 58.
Scalp, 56.
Shannon estuary, 40, 41, **42**, 44, 45, 46, 47, 50.
Shannon, River, 40, 41, 42, 43, 49, 56, 59, 60, 73, 74, 75, 101, 102.
Shean North, 106, **107**.
Sheffry, 82.
Skaghard Lough, 50.
Slieveanieran, **101**, 102, 104.
Slieve Aughty, 46, 49, 56, **58**, 59.
  Bane, 73.
  Bernagh, 46, **49**, 58, 59.
  Cor, 86.
  Elva, 51.
  Gamph, 77, 80, 87, **100**.
Slievemore, 92, **94**.
Sligo, County, 94.
  town, 90, **95**, 96, 98, 100.
Slyne Head, 68.
Strandhill, 98.
Suck, River, 56, 72, 73, 76.
Talt, Lough, 100.
Tarbert, 44.
Tipperary, County, 45, 59.
  town, 45.
Tobercurry, 94.
Tourmakeady, 79.
Truskmore, 97, 101.
Tuam, 71, **72**.
Tully pier, 91.
Turlough, 51.
Twelve Bens, 62, **65**, 66, 67, 69.
Urrisbeg, 68, **69**.
Westmeath, County, 48, 74.
Westport, 81, **84**.
  Quay, 85.
White River, 41.
Woodford, 56, 58, **59**, 60.
  River, 60.

SYSTEMATIC SECTION

SYSTEMATIC SECTION.

RANUNCULACEÆ.

***Clematis Vitalba** L. TRAVELLER'S JOY.—Naturalized. Rare. **Lim.**—about Foynes; near Limerick. **Clare**—by R. Fergus above Corofin; The Fountain. **Mayo E.**—near Cong.

Thalictrum alpinum L. ALPINE MEADOW-RUE.—Mountains. Rare. **Gal. W.**—Muckanaght; Benchoona; Maumeen; Ben Lettery. **Mayo W.**—Sheffry; Croaghpatrick; Glenummera. **Sligo**—Annacoona.

Its range is about 1300–2100 feet.

T. collinum Wallr. LESSER MEADOW-RUE.—Divisions all *except Lim.* Abundant on the limestone shores of Loughs Derg, Ree, Corrib, Mask, Carra, and Conn; more sparingly on Lower L. Erne. On limestone pavements occasionally. On mountains in Gal. SE. and W., Mayo W., Sligo, Leit. To 1800 feet on Mweelrea, and 1600 feet on Ben Bulben.

T. flavum L. MARSH MEADOW-RUE.—Damp meadows. Local. **Lim.**—Curragh Chase; frequent in NW. **Clare**—frequent in centre; Newmarket. **Gal. SE.**—Garryland; frequent by L. Derg. **Gal. NE.**—Clonbrock. **Rosc.**—frequent. **Ferm.**—Killygowan I. in Upper L. Erne.

Anemone nemorosa L. WOOD ANEMONE.—Divisions all. Frequent. To 1000 feet in Clare.

Ranunculus circinatus Sibth. RIGID WATER-CROWFOOT.—Lakes and pools on limestone. Rare. **Lim.**—Foynes; Newbridge; L. Gur; canal at Limerick. **Clare**—frequent in centre. **Rosc.**—Mount Talbot; L. Ree. **Sligo**—Feenagh L.

R. trichophyllus Chaix. HAIR-LEAVED WATER-CROWFOOT.—Frequent. Divisions all *except Leit., Ferm.*

R. Drouetii F. Schultz.—**Lim.**—Barrigone. **Gal. W.** and **Mayo E.**—about Cong. **Mayo W.**—Castlebar; Westport.

R. heterophyllus Weber. COMMON WATER-CROWFOOT.—Frequent. Divisions all *except Lim., Mayo W., Sligo, Leit.*

R. peltatus Schrank.—Rare. **Lim.**—Aughinish. **Clare**—Inchiquin (f. *elongatus*) and Inchicronin Loughs. **Mayo E.**—L. Cullin. **Mayo W.**—Foxford; L. Cullin.

var. **truncatus** (Hiern).—**Mayo E.**—east of Foxford.

R. penicillatus Dum. *R. pseudo-fluitans* Baker and Foggitt. —Streams. Frequent. Divisions all *except Mayo E. and W.*

R. Baudotii Godr. Maritime Water-Crowfoot.—Local. **Lim.**—near Foynes. **Clare**—frequent. **Gal. W.**—Inishbofin; Bunowen peninsula; Galway. **Gal. NE.**—Rinmore. **Mayo W.**—Cross L. and Newtown L. on the Mullet; N. and S. Inishkea. Inland at Inchiquin L. in Clare, but mostly by the sea.

var. **confusus** Godr.—**Lim.**—Foynes. **Clare**—near New Quay; Inchicronan L.

R. hederaceus L. Ivy-leaved Water-Crowfoot.—Divisions all. Frequent.

R. sceleratus L. Celery-leaved Water-Crowfoot.— Frequent. Divisions all *except Mayo E., Leit., Ferm.*

R. Flammula L. Lesser Spearwort.—Divisions all. Common. To 1850 feet on Ben Bulben range and Twelve Bens.

R. scoticus E. S. Marshall. *R. petiolaris* E. S. Marshall.—Stony lake margins in mountain regions, 50–1000 feet. Very local. **Gal. W.** and **NE.**—abundant on both sides of L. Corrib at Kilbeg ferry. **Mayo E.**—near Devenish in L. Mask; L. Corrib near Cong. **Mayo W.**—abundant in Achill. **Ferm.**—abundant on the hills west of Church Hill, to about 1000 feet.

A plant which may be this has been gathered at L. Bofin, Leit.

R. Lingua L. Great Spearwort.—Local. **Lim.**—L. Gur. **Clare**—Doonbeg; common in centre. **Gal. SE.**—Local; frequent only by L. Derg. **Gal. W.**—Maam and Letterfrack, not seen recently. **Gal. NE.**—frequent in Tuam district and by R. Suck. **Rosc.**—common. **Mayo E.**—L. Carra; Ballinrobe; Cong. **Ferm.**—about Enniskillen.

R. Auricomus L. Goldilocks.—Widespread but not common. Divisions all *except Gal. W.*

R. acris L. Meadow Crowfoot.—Divisions all. Common. To 2100 feet on Mweelrea, and 1850 feet on Ben Bulben range.

var. **Boræanus** (Jord.) is recorded from Gal. W. and Mayo E., and is probably common.

R. repens L. Sitfast. ꝑeaꞃ bán.—Divisions all. Common. To 1590 feet on Croaghpatrick.

R. bulbosus L. Bulbous Crowfoot.—Divisions all. Frequent on light soils.

R. Ficaria L. Lesser Celandine.—Divisions all. Common.

Caltha palustris L. Marsh Marigold.—Divisions all. Common. To 1050 feet on Ben Bulben range.

var. **Guerangerii** (Boreau).—**Sligo**—Gleniff.

C. radicans Forster. Creeping Marsh Marigold.—**Ferm.**—Devenish I., and thence occasionally to Enniskillen. Perhaps frequent on L. Erne. Elsewhere in Ireland known only from Co. Westmeath.

Trollius europæus L. Globe-flower.—**Ferm.**—common on Bilberry I. (Gorminish of one-inch map) in L. Melvin. Elsewhere in Ireland found only in Donegal.

Aquilegia vulgaris L. Columbine.—Native on limestone rocks; often of doubtful standing elsewhere. Local. Divisions all *except Mayo W., Sligo, Leit.* Among the best stations are—**Clare**—frequent in the north; Dromoland. **Gal. SE.**—frequent in Woodford district. **Gal. NE.**—frequent along L. Corrib. **Mayo E.**—limestone pavements on W. side of L. Carra.

NYMPHÆACEÆ.

Nuphar luteum Smith. *Nymphæa lutea* L. Yellow Water-Lily.—Divisions all. Frequent.

Nymphæa alba L. *Castalia alba* Wood. White Water-Lily. Duilleóige báite (Drowned Leaves).—Divisions all. Generally commoner in the west than the preceding.

PAPAVERACEÆ.

***Papaver somniferum** L. Opium Poppy.—Recorded from Foynes, Doon, and Castleconnell in Lim.; several Fergus islands in Clare; Foxford and near Headford in Mayo E.; Newtownbutler, Belleek, and Pettigoe in Ferm. Probably naturalized in some of these stations.

P. Rhæas L. Corn Poppy.—In 1866 this poppy had no record west of the Shannon. The fact that it is now recorded from every western division probably indicates as much the spread of the species as the more perfect exploration of the country. Frequent in N. and central Clare, and southern SE. Gal. Rare in the other divisions, and in certain stations little more than casual. Mallaranny (Mayo W.) is the only station off the limestone.

P. dubium L. Long Smooth-headed Poppy.—Divisions all. Frequent on the limestone, rarer on other rocks.

var. *Lamottei* (Bor.) is recorded from Lim., Clare, Gal. W. Mayo, and is common. Var. *Lecoqii* (Lamotte) is known to occur in Lim., Clare, Galway, and Mayo. The range of neither has been worked out.

†**P. Argemone** L. Prickly Long-headed Poppy.—Rare.

Chiefly in limestone gravel-pits. **Lim.**—Foynes. **Clare**—Kilfenora; Corofin. **Gal. NE.**—Ahascragh. **Rosc.**—Kiltoom; frequent about Athlone. **Mayo W.**—Mallaranny.

†**P. hybridum** L. PRICKLY ROUND-HEADED POPPY.—Rare and local, on light limestone soils. **Lim.**—Askeaton. **Clare**—frequent in N. and centre. **Gal. SE.**—frequent in the west. **Sligo**—Rosses Point.

Meconopsis cambrica Vig.—WELSH POPPY.—Very rare. Rocks, chiefly on mountains. **Lim.**—Glancushnabinnian in the Galtees; naturalized on shore near Foynes. **Clare**—Lisdoonvarna; Sixmilebridge. **Gal. W.**—Muckanaght, 1500 feet. **Sligo**—Ben Bulben; King's Mtn.; near Carrowkeel Mtn. **Ferm.**—sandstone scarp behind Poulaphuca; cliffs over Doagh L.

Glaucium flavum Crantz. HORNED POPPY.—Shingly beaches. Rare and very local. **Clare**—Shannon estuary at Scattery I. and Kilrush; Inishmaan in Aran. **Gal. SE., W.**, and **NE.**—frequent round Galway Bay from Kilcolgan River to Barna Head.

***Chelidonium majus** L. CELANDINE.—Introduced, and usually near houses. Not common, but recorded from all divisions.

FUMARIACEÆ.

***Corydalis lutea** DC. YELLOW FUMITORY.—A naturalized escape from gardens. **Gal. SE.**—Roxborough.

Fumaria capreolata L. *F. pallidiflora* Jord. RAMPING FUMITORY.—Frequent. **Lim.**—frequent about Foynes. **Clare**—frequent. **Gal. SE.**—Castle Taylor; Portumna; Loughrea. **Gal. W.**—Inishbofin. **Gal. NE.**—Oranmore. **Mayo W.**—Inishturk; Inishkea; Mullet; Achill. **Sligo**—Strandhill.

F. Boræi Jord. BOREAU'S FUMITORY.—Probably frequent. **Lim.**—Corbally; Limerick; Castleconnell. **Clare**—Parteen.

var. **serotina** Clavaud.—**Clare**—Delmege's Glen near Limerick.

F. confusa Jord. *F. Bastardi* Bor. BASTARD'S FUMITORY.—Divisions all *except Gal. W., Mayo E., Leit.* Common.

var. **hibernica** Pugsley.—**Rosc.**—Kilteevan. **Mayo W.**—Inishturk; N. and S. Inishkea; Clare I. **Sligo**—Strandhill; Beltra. **Leit.**—Mohill. This is a variety with dark-tipped corolla, apparently confined to Ireland.

F. officinalis L. COMMON FUMITORY.—Probably frequent. **Lim.**—Foynes; Cahirmoyle. **Clare**—frequent. **Gal. NE.**

—Dunmore. **Rosc.**—Kilteevan; Athlone. **Mayo W.**—Mullet.

F. densiflora DC. Dense-flowered Fumitory.—**Gal. NE.**—frequent around Tuam. **Leit.**—Mohill. Rare and local in Ireland.

§**F. Vaillantii** Loisel. Vaillant's Fumitory.—**Lim.**—a casual at Limerick.

CRUCIFERÆ.

Matthiola sinuata Br. Sea Stock.—Sandy sea-shores. Very rare. A decreasing species in Ireland. **Clare**—Straw Island off Inishmore, leaves only in 1894; Dough sandhills, not seen since before 1804.

***Cheiranthus Cheiri** L. Wallflower.—A garden escape, established on old buildings. Recorded from the towns of Limerick, Loughrea, Galway, Athlone, and Sligo; and from limestone crags at Barracks, Lim.

Nasturtium officinale Br. *Radicula Nasturtium-aquaticum* Rendle and Britten. Watercress. biolar.—Divisions all. Common.

var. **siifolium** (Reichb.).—**Lim.**—near Rinekirk.

var. **microphyllum** (Reichb.).—**Gal. W.**—Maam; Clonbur.

N. sylvestre Br. *Radicula sylvestris* Druce. Narrow-podded Marsh Cress.—Rare and local. **Lim.**—Shannon at Limerick; L. Gur. **Clare**—Shannon about Limerick; Inchiquin L.; Corofin; Dromore L. **Mayo W.**—†roadside on the Newport side of Westport. **Ferm.**—Belleisle.

N. palustre DC. *Radicula palustris* Mœnch. Broad-podded Marsh Cress.—Rather rare, but recorded from all divisions, and grows on the Aran Islands. Frequent only in central Clare, NE. Gal., and S. Leit.

§**N. austriacum** Crantz.—**Lim.**—casual at Limerick.

N. amphibium Br. *Radicula amphibia* Druce. Water Radish.—In lowland watery places like the last, but more generally distributed. Divisions all *except Gal. W.*

var. **variifolium** DC.—**Lim.** and **Clare**—common by the Shannon near Limerick.

N. amphibium × **sylvestre**. *N. barbarœdes* Tausch.—**Leit.**—Carrick-on-Shannon.

Barbarea vulgaris Ait. Winter Cress.—Divisions all. Frequent.

var. **arcuata** (Reichb.).—**Lim.**—frequent about Limerick. **Gal. SE.**—near Castle Taylor. **Rosc.**—Rockingham. **Mayo E.**—Hollymount. **Mayo W.**—Westport demesne.

B. intermedia Boreau. Intermediate Winter Cress.—**Sligo**—L. Key. Elsewhere in Ireland confined to the NE.

Arabis petræa Lamk. Mountain Cress.—**Leit.**—Glenade at 1330–1500 feet; about 50 plants seen in 1884. Elsewhere in Ireland found only near L. Curra on the Galtees, S. Tipperary.

A. hirsuta Scop. Rock Cress.—Divisions all. Generally abundant in limestone districts where drift is absent, on cliffs and pavements; sometimes on esker ridges, calcareous sea-sands, and walls. Extremely rare off the limestone. To 1200 feet on Maam Turk; 1400 feet in Leit.

var. **glabrata** Syme.—**Clare**—Inishmore.

A. ciliata Br. (*non* Koch). Fringed Rock Cress.—Sands and pastures near the sea. **Clare**—between Ballyvaughan and Black Head; Inishmore. **Gal. W.**—Dog's Bay and Bunowen peninsula, frequent; Renvyle.

In Ireland confined to the W. coast from Cork to Donegal. Unknown outside Ireland save in Pembrokeshire.[1]

Cardamine pratensis L. Lady's Smock.—Divisions all. Common. To 1600 feet on Ben Bulben range, and 1450 feet on Mweelrea.

C. hirsuta L. Hairy Bitter Cress.—Divisions all. Common. To 2100 feet on Mweelrea.

C. flexuosa With. Wood Bitter Cress.—Divisions all. Frequent.

§**Alyssum maritimum** Lam.—**Clare**—Inishmore.

Draba incana L. Twisted-podded Whitlow-grass.—**Gal. W.**—south shores of L. Mask. **Mayo W.**—sandhills at Killala. **Sligo**—sandhills at Rosses Point; frequent on limestone mountains S. to L. Arrow, up to 1950 feet. **Leit.**—Faughrey Mtn.; common in Glenade.

var. **confusa** (Ehrh.).—**Sligo**—Annacoona.

Erophila vulgaris DC. *Draba verna* L. Common Whitlow-grass.—Divisions all. Frequent. In Burren commences to flower in September.

var. **præcox** (DC.).—**Clare**—Ennistymon; Kilfenora. **Gal. SE.**—Athenry. **Gal. W.**—Salthill; Clifden.

Cochlearia officinalis L. Common Scurvy-grass. biolar trága (Strand Watercress).—All maritime divisions. Common along the coast.

var. **alpina** (Wats.).—Alpine situations. **Clare**—summit of Carnseefin. **Gal. W.**—summit of Ben Lettery. **Sligo**

[1] See F. Townsend in *Journ. Bot.*, Aug. 1903, and Georges Rouy in *Revue de Botanique Systématique*, Mai, 1903.

and **Leit.**—frequent in the Ben Bulben district, 1000–1900 feet.

C. danica L. Danish Scurvy-grass.—Dry places near the sea. **Lim.**—Glin. **Clare**—Loop Head; common in N. half. **Gal. SE.**—Oranmore. **Gal. W.**—Cashel; Inishbofin. **Gal. NE.**—frequent about Galway. **Mayo W.**—Clare Island; Inishturk; Achill; Inishkea. **Sligo**—Ballysadare; Rosses Point. **Leit.**—On the coast. To about 600 feet on old tower on Achill.

C. grœnlandica L. Greenland Scurvy-grass.—**Mayo W.**—maritime cliffs at Achill Head and on Inishturk. Elsewhere in Ireland found only in N. Donegal.

C. anglica L. English Scurvy-grass.—Muddy estuaries. Rare and local. **Lim.**—Aughinish; Foynes I.; Limerick. **Clare**—Parteen; frequent in Fergus estuary.

var. **Hortii** Syme.—**Lim.**—frequent on shore of Shanid barony. **Clare**—near Limerick.

§ **C. Armoracia** L. Horse Radish.—**Gal. SE.**—Loughrea.

§ **Hesperis matronalis** L. Dame's Violet. **Lim.**—Limerick. **Rosc.**—plentiful in woods at Rockingham. **Ferm.**—near Derrygonelly. Hardly naturalized in any part of Ireland.

§ **Malcolmia africana** Br.—**Lim.**—casual at Limerick.

Sisymbrium Thalianum Gay. Thale Cress.—Lowland dry places. **Lim.**—frequent in N. **Clare**—Newmarket; Canon I.; Ballyvaughan; Inishmore. **Gal. NE.**—NE. of Galway. **Mayo E.**—Ballinrobe. **Mayo W.**—Walls of Moyne Abbey. **Leit.**—Dromahaire.

S. officinale Scop. Hedge Mustard.—Divisions all. Common.

§ **S. Sophia** L. Flixweed. **Lim.**—Limerick; probably only casual here. Commoner and better established on the eastern side of Ireland.

§ **S. pannonicum** Jacq.—**Lim.**—casual at Limerick.

§ **S. orientale** L.—**Lim.**—casual at Limerick.

S. Alliaria Scop. Jack-by-the-Hedge.—**Lim.**—L. Gur; Doon; Thornfields. **Clare**—local. **Gal. NE.**—Claregalway. **Rosc.**—Kilteevan. **Mayo W.**—Killala. **Sligo** and **Leit.**—frequent. **Ferm.**—common.

* **Erysimum cheiranthoides** L. Treacle Hedge Mustard.—**Lim.**—Ardagh; Castleconnell. **Gal. SE.**—near Portumna. **Gal. W.**—Claddagh. **Rosc.**—Hudson's Bay on L. Ree; Kilteevan. **Ferm.**—Florencecourt station.

§ **E. orientale** Mill.—**Lim.**—Limerick.

Subularia aquatica L. Awl-wort.—Lake margins, generally at low levels in mountain districts. **Clare**—between Milltown and Kilkee. **Gal. W.**—Ballynahinch, Glendalough and Derryclare lakes; L. Coolin near Clonbur. **Mayo W.**—L. Lugaloughaun on Mweelrea, 1205 feet. Descends to about 50 feet in Clare.

§ **Camelina sativa** Crantz. Gold of Pleasure. **Lim.**—near Castleconnell, 1804; Limerick. **Gal. W.**—by L. Corrib at Lemonfield near Oughterard—an old unverified record. **Mayo W.**—frequent on the Mullet, 1836 (not there now).

§ **Brassica oleracea** L. Sea Cabbage.—**Mayo W.**—Newport.

B. Rapa L., var. **Briggsii** Wats. Wild Navew.—Divisions all. Generally of doubtful standing, but looks wild among rocks on the south shores of L. Mask, where it is abundant.

§ **B. Napus** L.—**Gal. W.**—Inishbofin.

B. nigra Koch. *Sinapis nigra* L. Black Mustard.—**Lim.**—about Limerick; abundant at Loghil. **Clare**—Cross; Carrigaholt; and in north, including Inishmore, rare. **Gal. W.**—‡Inishbofin. Native or at least naturalized in Clare.

B. Sinapis Visiani. *Sinapis arvensis* L. Charlock. Praiseaċ buiḋe.—Divisions all. Abundant.

B. alba Boiss. *Sinapis alba* L. White Mustard.—Divisions all. Rare in W. Gal. (excepting the SE.); local in Leit. and Ferm.; widely distributed elsewhere.

* **Diplotaxis muralis** DC. Wall Mustard.—**Lim.**—Killonan; Limerick. **Clare**—Ballycar; Ballvaughan. **Gal. NE.**—Galway. **Rosc.**—near Athlone and Ballinasloe. **Sligo**—Ballysadare; Sligo harbour.

A colonist, spreading rapidly westward along railways, and confined thereto in the above stations excepting Ballyvaughan and Sligo, where sea transit is probably accountable for its introduction.

§ **D. tenuifolia** DC. Narrow-leaved Wall Mustard.—**Mayo W.**—A single plant near Westport.

Capsella Bursa-pastoris Medic. Shepherd's Purse.—Divisions all. Common.

‡ **Senebiera didyma** Pers. *Coronopus didymus* Sm. Lesser Swine's Cress.—Frequent by the coast, rarer inland, in Lim., Clare, and Gal. Rare in Mayo (Westport, Newport, Achill Sound, Belmullet), and unknown further north. Chiefly about the seaside towns.

S. Coronopus Poiret. *Coronopus procumbens* Gilib. Swine's Cress.—Like the last, chiefly by the coast, and decreasing northward. Frequent in Lim., Clare, Gal.; rare in Mayo and Sligo.

* **Lepidium Draba** L. Whitlow Pepperwort.—**Lim.**—waste ground about Limerick; railway at Ardagh and Elmhill. **Mayo W.**—Westport Quay.

†**L. latifolium** L. Dittander.—**Lim.**—established about Limerick. A southern plant in Ireland, and not certainly native.

†**L. campestre** Br. Common Pepperwort.—**Lim.**—Limerick; Ballysimon **Gal. SE.**—south of Kinvarra. A colonist in cultivated fields.

L. hirtum Smith. *L. Smithii* Hook. *L. heterophyllum* Benth. var. *canescens* Gren. & Godr. Smooth-podded Pepperwort.—**Lim.**—Doon; †Limerick. **Clare**—near Kilfiddane church. Occurs in almost every Irish division outside of our district, having a distinctly calcifuge distribution. The Shannon practically marks its W. limit.

§**L. ruderale** L. Narrow-leaved Pepperwort.—**Lim.**—Rosbrien.

§**L. perfoliatum** L. **Lim.**—waste ground at Limerick.

§**L. virginicum** Gren. and Godr. **Lim.**—casual at Limerick.

†**Thlaspi arvense** L. Penny Cress.—**Lim.**—Askeaton; §Limerick. **Clare**—Inishmore; Inishmaan. **Sligo**—Cliffony; near Ben Bulben.

Like so many weeds of cultivation, decreases westward in Ireland.

Crambe maritima L. Sea-Kale.—Stony sea-shores. **Clare**—Murrough, one plant; in great abundance below the Seven Churches, Inishmore. **Gal. W.**—Gentian Hill, one plant.

A decreasing species in Ireland. Formerly grew in ten divisions. Now the Aran station is the only one where more than a few plants may be seen.

Cakile maritima Scop. Sea Rocket.—Sandy shores. Rare. **Clare**—Doonbeg. **Gal. W.**—Inishbofin. **Mayo W.**—Bartraw near Westport; Keel strand on Achill. **Sligo**—Inishcrone; Rosses Point; Raghly.

Raphanus Raphanistrum L. Wild Radish.—Cultivated fields. Divisions all *except Gal. SE., Rosc.* Common in Mayo, but local and rare in the remaining divisions. Occurs on all three Isles of Aran, Inishbofin, Clare I., Achill.

R. maritimus Smith. Sea Radish.—Sandy and stony shores. **Clare**—Inishmore; Inishmaan. **Gal. W.**—Roundstone and westward; Inishmacdara; Mason I.; Inishbofin. **Gal. NE.**—Ballyloughaun. **Sligo**—between Sligo and Ballina.

RESEDACEÆ.

†**Reseda lutea** L. Wild Mignonette.—**Lim.**—‡Limerick. **Clare**—Inishmore. **Gal. NE.**—L. Atalia. **Mayo W.**—*Newport.

R. Luteola L. Dyer's Weed. buıḋe móꞃ (Great Yellow).—Divisions all. Usually frequent on limestone soils, rarer elsewhere.

CISTINEÆ.

Helianthemum guttatum Mill. Spotted Rock-rose.—**Gal. W.**—abundant on Inishbofin and Inishark. **Mayo W.**—sparingly at Craggy on Inishturk.

Elsewhere in Ireland found only at Three Castle Head in West Cork. There, and on Inishbofin, var. **Breweri** (Planch.) accompanies the type, and alone grows on Inishark.

H. vineale Pers. Hoary Rock-rose.—**Clare**—locally abundant in Burren and on Inishmore; near the cliffs of Moher. **Gal. W.**—half a mile west of Salthill.

Not found elsewhere in Ireland. In Burren during May many hundreds of acres are yellow with the pretty blossoms of this plant, of which lemon-yellow forms occur among the orange-yellow type. The W. Galway station, though situated on the old metamorphic rocks, consists of a bank of glacial limestone drift.

VIOLACEÆ.

Viola palustris L. Marsh Violet.—Divisions all. Frequent.

V. odorata L. Sweet Violet.—Hedges and roadsides; widespread but rare, and doubtfully native in most stations. **Lim.**—Mullough; Parteen; ‡Askeaton. **Clare**—between Sixmilebridge and Newmarket. **Gal. SE.**—Portumna. **Gal. W.**—Barna. **Gal. NE.**—Cloonkeelway L.; †Clonbrock. **Rosc.**—west of Athlone; Kilteevan. **Mayo E.**—†Claremorris. **Mayo W.**—‡Derreen. **Ferm.**—Rossory; Derrygore.

V. hirta L. Hairy Violet.—Limestone rocks. Very local. **Lim.**—common at Askeaton and Mullough; SE. of Foynes. **Clare**—Canon I. and Inishtubrid in R. Fergus; abundant on Inishmore; Inisheer.

var. **glabrata** Beeby. **Lim.**—Aughinish.

V. Riviniana Reichb. Wood Violet.—Divisions all. Common. To 1700 feet on Ben Bulben range.

V. Riviniana × ericetorum.—**Lim.**—near Glin.

V. Reichenbachiana Boreau. *V. silvestris* Kit.—**Lim.**—Boniska; Ballynacragga. **Gal. SE.**—Castle Taylor. **Gal. W.**—Ashford. **Mayo E.**—L. Carra. **Mayo W.**—Newport.

Distribution still imperfectly known.

V. Reichenbachiana × Riviniana.—**Lim.**—near Mount Trenchard and Ardenoir.

V. canina L. *V. ericetorum* Schrad. Dog Violet.—Divisions all. Widespread, but usually rare. Frequent on the limestone shores of some of the larger lakes—Loughs Derg, Ree, Corrib, Mask, Carra, Conn, Erne.

V. lactea Sm. SMITH'S DOG VIOLET.—**Clare**—Ballyvaughan.

V. stagnina Kit. PALE DOG VIOLET.—Damp ground in limestone districts; essentially a plant of the turloughs, or depressions in the limestone which are flooded in winter. **Clare**—Turlough and L. Callagh in Oughtmama parish; Skaghard L. **Gal. SE.**.—Finnerty Moyode near Athenry; in a number of turloughs near Gort. **Mayo E.**—limestone hollows at S. end of L. Mask, hybridizing with *V. canina.*

Elsewhere in Ireland found only by the Shannon below Drumsna, Co. Longford.

V. tricolor L. WILD PANSY.—Divisions all *except Gal. SE. and NE.* Sparingly distributed, becoming rather rarer southward; seldom found on limestone.

V. arvensis Murr. FIELD PANSY.—Divisions all *except Leit.* Common in most districts.

V. Curtisii Forst. SEA PANSY.—Coast sandhills chiefly. Local. **Clare**—frequent on the coast and Aran Islands. **Gal. W.**—Dog's Bay and westward. **Mayo W.**—Killala. **Sligo**—Mullaghmore; Strandhill. **Ferm.**—L. Erne at Lisnaskea.

var. **Pesneaui** Rouy and Foucaud.—**Sligo**—Mullaghmore.

V. lutea Huds. MOUNTAIN PANSY.—Upland pastures and sandhills. Very rare, but abundant where it occurs. **Clare**—near cliffs of Moher up to 700 feet; sandhills at Doonbeg, Miltown-Malbay, and Lehinch.

POLYGALEÆ.

Polygala vulgaris L. MILKWORT.—Divisions all. Frequent.

var. **grandiflora** Bab.—**Sligo** and **Leit.**—Frequent on cliffs of the Ben Bulben range, as on Ben Bulben, in Glencar, Glenade, &c., ascending to 1700 feet.

var. **oxyptera** (Reichb.).—**Lim.**—Foynes. **Gal. W.**—Dog's Bay; Maam; four miles west of Cong. **Mayo E.**—south of Cong. **Mayo W.**—west of Castlebar. **Sligo**—Ben Bulben to 1300 feet.

P. serpyllacea Weihe. *P. depressa* Wend. LESSER MILKWORT.—Divisions all. Frequent. Distinctly calcifuge. To 1480 feet on Achill.

Plants very near *P. calcarea* F. Schultz have been gathered near Tuam, NE. Gal., and near Athlone, Rosc.

CARYOPHYLLEÆ.

***Saponaria officinalis** L. Soapwort.—A garden escape which decreases westward in Ireland, and in our district is on record only from Lim., Clare, Sligo, and Ferm.

§**S. Vaccaria** L. **Lim.**—casual at Limerick.

§**Silene Ameria** L. Garden Catchfly.—A rare casual. **Clare** —Kilrush.

S. Cucubalus Wibel. *S. latifolia* Rendle and Britten. Bladder Campion.—Divisions all. Frequent. Var. *puberula* (Jord.) is recorded from Foynes in Lim. and Garryland in SE. Gal., and is probably widespread.

S. maritima With. Sea Campion.—Divisions all *except Rosc., Mayo E., and Ferm.*, which lie entirely inland. Abundant along the sea-board. Frequent on the mountains of W. Galway to 2250 feet; on Birreencorragh, Nephin and Croaghpatrick in W. Mayo; and on the limestone cliffs of the Ben Bulben range in Sligo and Leit. to 1550 feet.

§**S. conica** L. Striated Catchfly.—**Lim.**—casual at Limerick.

§**S. anglica** L. English Catchfly.—The only records in the district are from "Oughterard," and "two miles west of Oughterard," seventy years ago, where the plant was apparently not permanent. Has a tolerably wide distribution round the rest of the Irish coast-line.

S. acaulis L. Cushion Pink.—**Mayo W.**—On the maritime precipice of Croaghmore on Clare I., 400–1300 feet. **Sligo** and **Leit.**—locally abundant on the limestone cliffs of the Ben Bulben range, 1100-1600 feet.

Ben Bulben is the Irish head-quarters of this alpine species; its only stations outside our district are Dunaff Head in Donegal and Benevenagh in Londonderry.

†**Lychnis vespertina** Sibth. *L. alba* Mill. White Campion.—Decreases westward in Ireland. **Gal. W.**—casual at Ashford. **Rosc.**—Yew Point and Hudson's Bay on L. Ree. **Mayo E.**—Ballinrobe.

L. diurna Sibth. *L. dioica* L. Red Campion.—Divisions all *except Mayo E.*, but Ferm. is the only county in which the plant is frequent. In each other division only one or two stations are on record. The sole W. Mayo station, curiously enough, is Inishturk, seven miles out in the Atlantic. To 1800 feet on Ben Bulben range.

L. Flos-cuculi L. Ragged Robin.—Divisions all. Common.

‡**L. Githago** Scop. Corn-cockle.—A colonist in light cultivated soil. Very local. **Lim.**—about Limerick; Barrigone. **Clare** — frequent in the north. **Gal. SE.** — Garryland.

Gal. W.—frequent on east margin. **Gal. NE.**—Claregalway. **Mayo E.**—Ballinrobe; Ballintubber. **Sligo**—Ballysadare; Strandhill. **Ferm.**—Gubbaroe Point on Lower L. Erne.

Cerastium tetrandrum Curtis. FOUR-CLEFT MOUSE-EAR.—Divisions all *except Ferm.*; frequent around the coast. Rarer away from the sea, as on the limestone shores of L. Conn and L. Mask; railway tracks in south Rosc.; dry boggy ground about Foxford and Hollymount; limestone hills at L. Gur, and summits of Keshcorran (1163 feet) and Knocknarea.

C. semidecandrum L. LITTLE MOUSE-EAR.—Much rarer than the last. **Clare**—Sandhills at Fanore. **Rosc.**—‡railway at Mote Park. **Mayo W.**—sands at Mallaranny.

C. glomeratum Thuill. *C. viscosum* L. BROAD-LEAVED MOUSE-EAR.—Divisions all. Common.

C. triviale Link. *C. vulgatum* L. COMMON MOUSE-EAR.—Divisions all. Common. To 2450 feet on Mweelrea, and 1850 feet on Ben Bulben range. A sub-glabrous form, with dark green shining foliage, on sand-dunes on the Mullet, Mayo W.

C. arvense L. LARGE-FLOWERED MOUSE-EAR.—Dry places on sand-dunes or limestone. Very local, and forming practically one great colony around Galway Bay. **Clare**—abundant in Burren and Aran. **Gal. SE.**—common on the coast. **Gal. W.**—Inveran; common at Galway. **Gal. NE.**—common on the coast.

var. **Andrewsii** Syme.—**Clare**—Poulsallagh; frequent on the Aran Islands.

Stellaria media Vill. CHICKWEED. Flioḋ.—Divisions all. Common.

S. umbrosa Opiz.—**Clare**—limestone crags at Fisherstreet. Elsewhere in Ireland recorded only from Castletownroche in Cork.

S. Holostea L. GREATER STITCHWORT.—Divisions all; frequent.

S. palustris Retz. *S. glauca* With. MARSH STITCHWORT.—A frequent plant in the Central Plain, and most of the western stations lie inland along slow rivers and lakes on the limestone. **Clare**—Castleconnell. **Gal. SE.**—Portumna. **Gal. W.**—Clonbur. **Gal. NE.**—Tuam; Castlegrove. **Rosc.**—Kiltoom; Lanesborough; Knockview. **Mayo E.**—Hollymount. **Sligo**—Ballysadare. **Leit.**—Rinn Lough. **Ferm.**—frequent along L. Erne.

S. graminea L. LESSER STITCHWORT.—Divisions all. Frequent. To 1050 feet on Ben Bulben range.

S. uliginosa Murr. BOG STITCHWORT.—Divisions all. Common.

Arenaria verna L. *Alsine verna* Bartl. SPRING SANDWORT.—**Clare**—Abundant on the three Aran Islands, in Burren, and on the Central Clare limestones down to Ennis, from sea-level to over 1000 feet.

Elsewhere in Ireland confined to the basaltic plateau of the north-east.

*__A. tenuifolia__ L. FINE-LEAVED SANDWORT.—A railway colonist, first observed in Ireland in 1897, now widely distributed, on railway tracks only, chiefly in the Central Plain. **Lim.**—Killonan. **Clare**—Crusheen. **Gal. SE.**—Loughrea; Ardrahan; Attymon. **Gal. W.**—Oughterard. **Gal. NE.**—Attymon; Woodlawn. **Rosc.**—Athlone neighbourhood.

A. trinervia L. THREE-NERVED SANDWORT.—Shady places. Widely but sparingly distributed. Divisions all *except Gal. W. and Mayo W.*, a district in which most woodland plants are rare.

A. serpyllifolia L. THYME-LEAVED SANDWORT.—Divisions all. Frequent, especially on the limestone and along the coast.

var. **leptoclados** (Guss.).—**Lim.**—Limerick; L. Gur. **Clare**—Moyrhee near Corofin. **Gal. SE.**—Coole; Ballinasloe; Castle Taylor. **Mayo E.**—south of L. Mask.

A. ciliata L. FRINGED SANDWORT.—Very local. An alpine species not found elsewhere in the British Islands. **Sligo**—locally abundant on the limestone cliffs of the Ben Bulben range, 1000–1950 feet. Confined to the more western hills; a line drawn north from Glencar Lake defines its eastern limit (see map, p. 97). About Annacoona, which appears to be the plant's head-quarters, it grows freely on rock-scarps on the plateau above the cliff-range, and also on the grassy screes in Gleniff, at the base of the Annacoona cliffs. Flowers June–July. See plate 16.

Probably found by Lhwyd in 1699. First recorded by J. T. Mackay in 1806 (see pp. 31, 32).

A. peploides L. SEA PURSLANE.—Sandy and gravelly shores. In all maritime divisions (in other words, all divisions *except Rosc.*, *Mayo E.*, *Ferm.*), and remarkably widespread. For instance, on Inishturk, the only sand above high water-mark is a patch not 10 yards square; yet the plant is present there.

Sagina apetala Ard. ANNUAL PEARLWORT.—Divisions all. Frequent.

S. maritima Don. SEA PEARLWORT.—By the sea. Local.

ARENARIA CILIATA.
In the author's garden at Dublin, May, 1907. Roots from Annacoona,
R. Welch, Photo. Co. Sligo, July, 1904.

AJUGA PYRAMIDALIS AT POULSALLAGH, CO. CLARE.
Among its most abundant concomitants here are *Helianthemum vineale, Geranium sanguineum, Saxifraga Sternbergii, Gentiana verna, Sesleria cærulea.* The snails are *Helix ericetorum*, a characteristic xerophile

Lim.—Mount Trenchard; Glin. **Clare**—frequent. **Gal. W.**—frequent in SW. Connemara. **Gal. NE.** — Rinmore. **Mayo W.**—frequent. **Sligo**—Mullaghmore; Inishmurray.

var. **densa** (Jord.). **Mayo W.**—Dooagh on Achill I.

S. ciliata Fries.—Fries' Pearlwort.—By the sea. Probably more frequent than would appear by the records. **Clare**—near Moerne Head.

S. procumbens L. Procumbent Pearlwort.—Divisions all. Common. To 1650 feet on Croaghpatrick.

S. subulata Presl. Awl-leaved Pearlwort.—Near the sea, and on mountains. Local. **Clare** — Kilkee; Cliffs of Moher; Inishmore. **Gal. W.**—Ben Lettery; Maumeen; Benchoona to 1970 feet; Leckavrea; Urrisbeg; Dog's Bay; Bunowen peninsula at sea-level; Inishbofin. **Mayo W.**—Inishturk.

S. nodosa Fenzl. Knotted Spurrey.—Divisions all. Frequent. To 1800 feet on Ben Bulben range.

Spergula arvensis L. Corn Spurrey.—Divisions all. A very common weed, especially in peaty ground. The segregates *S. vulgaris* and *S. sativa* have usually not been distinguished; but the former is recorded from Gal. W. and Mayo W., and the latter from Gal. SE. and W., and Mayo W.

Spergularia media Presl. *Lepigonum marginatum* Koch. *L. marinum* Wahlb. Sea Sandwort.—Muddy places by the sea. Frequent along the whole coast-line.

S. salina Presl. *Lepigonum salinum* Kindb. Intermediate Sandwort.—As widely distributed as the last, but usually not so common.

S. rupestris Lebel. *Lepigonum rupicola* Kindb. Rock Sandwort.—Sea-rocks and sea-cliffs up to 700 feet. Frequent. **Lim.**—Ringmoylan; Loghil. **Clare**—Loop Head; Kilrush; Fergus estuary; Spanish Point; Inishmore. **Gal. W.**—Inishmacdara; Inishbofin; Roundstone; Ballyconneely. **Mayo W.**—Achill; Clare I., Inishturk; Inishkea; Mullet. **Sligo**—Mullaghmore.

PORTULACEÆ.

Montia fontana L. Water Blinks.—Divisions all. Strongly calcifuge. To 1250 feet in Mayo. Var. *minor* All. is common; var. *rivularis* All. is recorded from E. and W. Mayo, and Leit.

ELATINEÆ.

Elatine hexandra DC. HEXANDROUS WATERWORT.—Very local. **Clare**—between Miltown-Malbay and Kilrush; abundant in pools on Doonbeg bog; Monmor L. **Gal. W.** —Cregduff L. at Roundstone; several lakes on Inishbofin.

HYPERICINEÆ.

Hypericum Androsæmum L. TUTSAN.—Divisions all. Frequent. To 1000 feet on Ben Bulben range.

H. perforatum L. PERFORATED ST. JOHN'S-WORT.—Divisions all *except Sligo and Leit.* These exceptions are peculiar in view of the fact that the plant is distinctly calcicole. Generally frequent.

H. dubium Leers. *H. maculatum* Crantz. IMPERFORATE ST. JOHN'S-WORT.—Divisions all, but usually rare, being common only in the eastern parts of Galway. A plant which decreases northward in Ireland.

H. tetrapterum Fries. *H. quadrangulum* L. SQUARE-STALKED ST. JOHN'S-WORT.—Divisions all. Frequent.

H. humifusum L. TRAILING ST. JOHN'S-WORT.—Divisions all. Irregularly and thinly distributed, avoiding limestone areas.

H. pulchrum L. UPRIGHT ST. JOHN'S-WORT.—Divisions all. Common. To 2000 feet on Mweelrea

var. **procumbens** Rostrup. **Mayo W.**—cliffs of Croaghaun on Achill I., 1500–2000 feet.

H. elodes L. MARSH ST. JOHN'S-WORT.—Strongly calcifuge. A characteristic species of the Connaught mountain district, though lowland in its range. **Clare**—frequent in the west. **Gal. W.** and **Mayo W.**—common. **Leit.**—Tullaghan.

MALVACEÆ.

‡**Althæa officinalis** L. MARSH MALLOW.—Probably a garden escape. **Lim.**—Lehies; Dernish. **Clare**—frequent near the sea. **Gal. W.**—a mile west of Roundstone. **Rosc.**—*near Ballinasloe. **Mayo W.**—Old Head.

Lavatera arborea L. TREE MALLOW.—Without question native in **Clare**, on sea-cliffs and stacks on Inishmore and at Spanish Point. Apparently established as an escape from cultivation in **Lim.** (Foynes), **Clare** (Fergus estuary), **Gal. SE.** (Parkmore), **Mayo W.** (Achill Sound), and **Sligo** (Rosses Point).

‡**Malva moschata** L. Musk Mallow.—Local, and probably not native in any of its stations. Divisions all *except Gal. SE., Mayo W., Leit., and Ferm.*, but attains frequency only in north Lim. Usually near towns or houses.

M. sylvestris L. Common Mallow.—Divisions all. Chiefly by the coast, not far from houses.

M. rotundifolia L. Dwarf Mallow.—Chiefly by the coast, and often near houses. **Clare**—north and west, including Aran. **Gal. SE.**—coast, common. **Gal. W.**—Inveran; †Kilbeg ferry. **Gal. NE.**—about Galway; Drumgriffin. **Ferm.**—‡Levally.

§**M. borealis** Wallm.—**Lim.**—waste ground at Limerick and Glenstal.

§**M. parviflora** L.—**Lim.**—casual at Limerick.

LINEÆ.

Radiola linoides Roth. Allseed.—Strongly calcifuge. **Clare**—Scattery I.; L. Senan; Kilkee district. **Gal. W.**—widespread and frequent. **Mayo E.**—L. Cullin. **Mayo W.**—frequent. **Sligo**—Inishmurray; Raghly.

Linum catharticum L. Purging Flax. Míoraċ.—Divisions all. Common. To 1100 feet in W. Mayo.

L. angustifolium Huds. Pale-flowered Flax.—South only. **Lim.**—Askeaton; between Mount Trenchard and Loghil. **Clare**—abundant by the Shannon between Labasheeda and Killadysert; railway at Ballycar. **Gal. SE.**—between Woodford and L. Derg.

GERANIACEÆ.

Geranium sanguineum L. Bloody Cranesbill.—One of the most characteristic species of the limestone pavements and lake shores, growing in immense profusion, and in our district hardly found in any other situation. **Clare**—very abundant in Aran, Burren (to 1000 feet), and on the limestone down to Ennis. **Gal. SE.**—common in the SW., and on the shores of L. Derg. **Gal. W.**—on the limestone between Oughterard and Galway occasionally. **Gal. NE.**—Coolaran; Claregalway; near Knockmae; common along L. Corrib. **Rosc.**—Bridewell near Athlone. **Mayo E.**—abundant near Glen Corrib and Ballycurrin.

***G. Phæum** L. Dusky Cranesbill.—Garden escape. **Lim.**—Curragh Chase; Glenstal. **Ferm.**—Rossory, spreading.

§**G. pratense** L. Meadow Cranesbill.—Garden escape.

Mayo W.—meadow at Dugort. **Gal. SE.**—Castle Taylor. **Rosc.**—Rockfield.

§ **G. sylvaticum** L. Wood Cranesbill.—**Lim.**—established at Glenstal.

† **G. pyrenaicum** L. *G. perenne* Huds. Mountain Cranesbill.—**Lim.**—near Rinekirk; Killonan. **Clare**—Ballyallia. **Gal. SE.**—near Craughwell. **Mayo E.**—Ballinrobe. **Mayo W.**—"near Belmullet," apparently not there now. Decreases westward in Ireland.

G. molle L. Soft Cranesbill.—Divisions all. Common.

† **G. pusillum** L. Small-flowered Cranesbill.—Very rare, and possibly introduced. **Lim.**—Ringmoylan. **Clare**—Miltown-Malbay. **Mayo E.**—near Ballinrobe.

G. rotundifolium L. Round-leaved Cranesbill.—**Clare**—on limestone rocks and walls along a lane at Townross near Ballyvaughan.

G. dissectum L. Dove's-foot.—Divisions all. Frequent.

G. columbinum L. Long-stalked Cranesbill.—On limestone rocks. Local. **Lim.**—Askeaton; Mullough; Foynes. **Clare**—near Ennis; Rineanna Point; Rinnamona L.; Ballyvaughan; Inishmore. **Gal. SE.**—L. Derg near Portumna; frequent in the SW. **Gal. W.**—metamorphic rocks on Bunowen peninsula. **Gal. NE.**—between Kilcornan and Rahasane. **Mayo E.**—SE. end of L. Mask.

G. lucidum L. Shining Cranesbill.—Strongly calcicole, and distributed accordingly. Absent from Mayo W., and from Gal. W. excepting the strip of limestone along L. Corrib. Frequent but usually local in the remaining divisions. To 650 feet in Clare.

G. Robertianum L. Herb Robert.—Divisions all. Common. To 1700 feet on the Ben Bulben range.

var. **purpureum** Forst.—**Clare**—Aran Islands. **Gal. W.**—Inishbofin.

Erodium cicutarium L'Hérit. Hemlock Storksbill.—Common in sandy ground by the sea, occurring in all maritime divisions except Leit., the coast of which is rocky. Inland and probably casual at Limerick, and at Kilbeg ferry in W. Gal.

E. moschatum L'Hérit. Musky Storksbill.—Chiefly about seaside towns. Decreases northwards. **Lim.**—Newcastle; Limerick; Glin. **Clare**—near cliffs of Moher; Inishmore. **Gal. W.**—Clifden. **Gal. NE.**—Rinmore. **Mayo W.**—Dooagh on Achill, 1840, not seen since.

E. maritimum L'Hérit. Sea Storksbill.—**Clare**—Inishmore. There is an old unconfirmed record from Aughris in Gal. W. On the south and east coasts of Ireland the plant is frequent.

Oxalis Acetosella L. WOOD-SORREL. Seamróg.—Divisions all. Abundant. To 2200 feet on Achill, and 1600 feet on Ben Bulben range. "There appears . . . to be absolutely no evidence that this species was at any time used by the Irish as their national badge"—*Cybele Hibernica*, ed. II.

ILICINEÆ.

Ilex Aquifolium L. HOLLY. Cuileann.—Divisions all. Common. A characteristic member of the limited arboreal vegetation of the extreme west. To 1250 feet on the Twelve Bens.

CELASTRINEÆ.

Euonymus europæus L. SPINDLE-TREE.—Divisions all. Frequent, chiefly on the limestone. A characteristic shrub of the limestone pavements.

RHAMNEÆ.

Rhamnus catharticus L. PURGING BUCKTHORN.—On limestone mostly, frequent on lake shores and pavements. **Lim.**—Mount Shannon; W. of Adare. **Clare**—frequent in centre, north, and Aran. **Gal. SE.**—frequent on L. Derg and in west. **Gal. W.**—by L. Corrib and L. Mask, rare. **Gal. NE.**—Clonbrock; frequent by L. Corrib. **Rosc.**—Mote Park; Mount Talbot; Galey; St. John's Wood. **Mayo E.**—NW. of Claremorris; frequent by L. Mask and L. Carra. **Mayo W.**—L. Cullin; L. Mask. **Ferm.**—common on Lower L. Erne.

R. Frangula L. ALDER BUCKTHORN.—With the last, but much rarer. **Clare**—Glanquin; Rockforest. **Gal. SE.**—about L. Derg and in SW., rare. **Gal. W.**—Cannaver I. in L. Corrib; L. Mask. **Rosc.**—Kilteevan. **Mayo E.**—S. and E. shores of L. Mask; frequent on L. Carra. **Mayo W.**—N. shores of L. Mask.

§**Acer campestre** L. COMMON MAPLE.—**Lim.**—Curragh Chase (var. *leiocarpon* Wallr.); near Foynes. **Clare**—Castle Crin. **Rosc.**—Mount Talbot; Kilteevan. **Mayo E.**—Kilmovee. **Sligo**—Sligo; Ballysadare. **Ferm.**—near Enniskillen.

§**A. Pseudo-platanus** L. SYCAMORE.—**Mayo E.**—quite naturalized near Clonbur.

LEGUMINOSÆ.

Ulex europæus L. GORSE; WHIN; FURZE. Aiteann.—Divisions all. Locally common.

U. Gallii Planch. DWARF FURZE.—Strongly calcifuge. Very local, and absent from large areas of even non-calcareous rocks. **Lim.**—By R. Galey below Rooskagh. **Clare**—Inishmore. **Gal. SE.**—Dalystown; Chevy Chase. **Gal. W.**—Abundant. **Mayo W.**—Near Dooega, Achill, one bush, possibly introduced.

var. **humilis** Planch.—**Gal. W.**—Roundstone.

Cytisus scoparius Link. Broom.—Divisions all. Common off the limestone.

Ononis repens L. Rest-harrow.—Chiefly by the sea, on limestone, decreasing northward.—**Lim.**—frequent in the north. **Clare**—*Ballyvaughan. **Gal. SE.**—Ardrahan; Oranmore; Ardfry. **Gal. W.**—Moycullen. **Gal. NE.**—Tuam; near Claregalway. **Mayo E.**—Ballinrobe; Cong. **Mayo W.**—Ballina.

*__Medicago sativa__ L. Lucerne.—A crop plant occasionally run wild. **Lim.**—Mullough; Curragh Chase. **Clare**—Inishmore.

M. lupulina L. Black Medick.—Divisions all. Common.

§**M. falcata** L. Yellow Lucerne.—A rare casual. **Lim.**—Corbally; old quarry at Limerick. **Clare**—roadside at Killaloe, one plant.

§**M. denticulata** Willd. Reticulated Medick.—**Lim.**—casual at Limerick.

§**Melilotus altissima** Thuill. Common Melilot.—Merely casual in the west. **Clare**—near Ballyvaughan.

§**M. alba** Desr. *M. vulgaris* Willd. White Melilot.—A casual. **Lim.**—about Limerick. **Clare**—Kilrush.

§**M. arvensis** Wallr. Field Melilot.—Little more than casual. **Lim.**—waste ground at Limerick. **Gal. SE.**—Garryland.

§**M. parviflora** Lam. Small-flowered Melilot.—**Lim.**—casual at Limerick.

Trifolium pratense L. Red Clover.—Divisions all. Common.

T. medium L. Zigzag Clover.—Local. **Lim.**—Cahirmoyle. **Clare**—Lisdoonvarna; Inishmore. **Gal. SE.**—near Ardrahan. **Mayo E.**—Carrowkeribly L.; L. Mask; L. Carra; near Foxford. **Mayo W.**—Inishturk; common in the NE. **Sligo**—Annaghmore; Skreen; Dromore West. **Ferm.**—frequent.

†**T. arvense** L. Hare's-foot Trefoil.—Rare and local. **Clare**—Inisheer. **Mayo W.**—Inishturk. Only on these islands, and perhaps originally introduced. It is frequent on the east coast of Ireland.

§**T. maritimum** Huds. *T. squamosum* L. Teasel-headed Trefoil.—**Clare**—border of a field near Liscannor.

T. striatum L. Soft Knotted Trefoil.—**Clare**—near the

Black Fort on Inishmore. A coast plant in Ireland, chiefly in the south and east.

***T. hybridum** L. Alsike Clover.—An introduced fodder plant, recorded from Lim., Gal. SE., W., and NE., Mayo E. and W., Sligo, Leit., Ferm.

T. repens L. White or Dutch Clover; Shamrock. Seamꞃóᵹ.—Divisions all. Common. To 1550 feet on Ben Bulben range, and 1430 feet on Mweelrea.

This plant shares equally with *T. dubium* the honour of being worn as the Irish national badge on St. Patrick's Day[1]; but small forms are generally selected, and large ones not admitted as "Shamrock"; which suggests that *T. dubium* is really the plant intended.

T. fragiferum L. Strawberry-headed Trefoil.—**Sligo**—by the river below Drumcliff. Elsewhere found along the coast from Kerry to Louth.

§**T. agrarium** L.—A casual. **Gal. NE.**—Knockmae.

T. procumbens L. Hop Trefoil.—Divisions all *except Leit.* Frequent.

T. dubium Sibth. *T. minus* Smith. Small Yellow Trefoil; Shamrock. Seamꞃóᵹ.—Divisions all. Common. Shares with *T. repens* the distinction of being worn as the national badge on St. Patrick's Day (see under *T. repens*).

T. filiforme L. Slender Yellow Trefoil.—Very rare; not found recently. **Clare**—specimens labelled "Co. Clare" are preserved in Dr. D. Moore's herbarium. **Gal. W.**—Leenane, 1835.

Anthyllis Vulneraria L. Lady's Finger.—Divisions all *except Leit.* Chiefly on the limestone and near the sea. To 1450 feet in Sligo.

Lotus corniculatus L. Bird's-foot Trefoil.—Divisions all. Common. To 1500 feet on Ben Bulben range.

L. uliginosus Schk. *L. major* Smith. Greater Bird's-foot Trefoil.—Local, and increases off the limestone. Divisions all *except Mayo E.*

Astragalus hypoglottis L. *A. danicus* Retz. Purple Milk Vetch.—Confined in Ireland to the Aran Islands. On Inishmore it occurs in sandy pastures near Killeany, and rocky pastures near Kilmurvy and at Dun Ængus. Also recorded from Inishmaan.

§**Cicer arietinum** L.—**Lim.**—casual at Limerick.

§**Coronilla Securidaca** L.—**Lim.**—casual at Limerick and Cahirmoyle.

---

[1] See N. Colgan, *Irish Nat.*, i., 95–97, 1892; ii., 207–211, 250–251. 1893.

Vicia hirsuta Gray. HAIRY TARE.—Rare but widespread. Divisions all *except Rosc.*, *Mayo W.*, *Leit.*, but recorded from only one or two stations in each division.

V. Cracca L. TUFTED VETCH.—Divisions all. Common.

var. **incana** Thuill.—**Gal. W.** and **Mayo E.**—Clonbur.

V. Orobus DC. BITTER VETCH.—Bushy and rocky ground. Very rare and local. **Gal. SE.**—Church I. in L. Derg near Portumna. **Gal. W.**—Bilberry I. and other islands in L. Corrib. **Gal. NE.**—limestone heaths at Castle Lambert, Coolaran, and Cregmore. The only other certain Irish stations are in Co. Antrim.

V. sylvatica L. WOOD VETCH.—Bushy and rocky places. Rare. **Lim.**—Ringmoylan wood. **Clare**—south of Slieve Elva. **Gal. W.** — Doon and Streamstown, not seen recently. **Mayo E.** — near Houndswood. **Sligo** — Ben Bulben, not found recently. **Leit.**—Glenade; Arroo Mtn. **Ferm.**—frequent on Lower L. Erne, and on the hills SW. of it to 1000 feet. To 1350 feet in Leit.

V. sepium L. BUSH VETCH.—Divisions all. Common. To 1850 feet on Mweelrea, and 1300 feet on Ben Bulben range.

§**V. sativa** L. COMMON VETCH.—An occasional straggler from cultivation, not permanent.

V. angustifolia L. NARROW-LEAVED VETCH.—Widespread but rare. Divisions all *except Rosc.*, *Mayo W.*

Lathyrus pratensis L. MEADOW VETCHLING.—Divisions all. Common.

L. palustris L. BLUE MARSH VETCHLING.—Marshy meadows. Rare and local. A Central Plain plant chiefly, confined to the east of our district. **Gal. SE.**—by the Shannon above Portumna bridge. **Rosc.** — Clooneigh River; L. Key; abundant by the Shannon above Athlone. **Ferm.**—common near Belleisle House.

L. macrorrhizus Wimm. *L. montanus* Bernh. HEATH PEA.—Divisions all. Frequent. To 1520 feet on Mweelrea.

var. **tenuifolius** Reichb. fil.—**Gal. W.**—near Leenane.

ROSACEÆ.

Prunus spinosa L. BLACKTHORN; SLOE. Ꝺꞃαıᵹeαn.—Divisions all. Common. To 1200 feet on Ben Bulben range.

***P. insititia** L. BULLACE.—Chiefly in hedges. Nowhere native. **Lim.**—Limerick; L. Gur; Doon; near Newbridge. (**Clare**—erroneously recorded from Inishmore). **Gal. W.**—Bilberry I. in L. Corrib. **Sligo**—Sligo. **Leit.**—Garadice L. **Ferm.**—frequent about Enniskillen.

P. Avium L. Wild Cherry.—Woods and hedges. Rare. Sometimes native. **Lim.**—Bilboa River, native; Cahirmoyle; Glenastar; Mullough. **Gal. W.**—Moycullen. **Rosc.**—†near Athlone. **Mayo E.**—islands in L. Carra, native. **Sligo**—"Co. Sligo." **Ferm.**—frequent, ? native.

‡**P. Cerasus** L. Dwarf Cherry.—Hedges and banks. Frequent. Naturalized in some places. Divisions all. In Gal. W. at Clonbur only.

P. Padus L. Bird Cherry.—Woods and glens. Usually native. **Lim.**—‡Glenstal. **Clare**—Bridgetown. **Gal. SE.**—Woodford; Roxborough hills; Ballinasloe. **Gal. NE.**—Clonbrock; Donamon. **Rosc.**—Kilteevan; Mote Park. **Mayo E.**—L. Carra; Newbrook. **Sligo.**—Lough Achree. **Leit.**—Lurganboy; Larkfield. **Ferm.**—Cooneen.

Spiræa Ulmaria L. Meadow-sweet. Aıꞃᵹıoꝺ luaċꞃa (Silver of Rushes).—Divisions all. Common. To 1700 feet on Ben Bulben range.

S. Filipendula L. Dropwort.—The range of this plant in Ireland is very limited, and forms mainly a single continuous colony in Clare and SE. Gal. Its head-quarters are the great stretch of low limestone pavements that extend from Gort and Ardrahan to the Burren hills. It runs southward to beyond Rockforest, and abounds throughout Glencolumbkille. Westward it is reported from Boston and Black Head. The only outlying station is Portumna on the Shannon, where it has not been seen recently. Not recorded from above 550 feet.

Rubus Idæus L. Raspberry.—Divisions all. Frequent. To 1800 feet in Leit.

var. **asperrimus** Lees.—**Lim.**—Thornfields.

R. suberectus Anders.—**Gal. NE.**—near Headford.

R. plicatus Wh. & N.—Frequent. **Lim.**—Newbridge; near Cahirmoyle; Castleconnell. **Gal. SE.**—Lough Derg below Woodford. **Gal. W.**—Tully; S. of L. Mask. **Gal. NE.**—Clonbrock. **Mayo E.**—S. of L. Mask. **Mayo W.**—Dugort on Achill; Clare I.; common in Mallaranny district. **Sligo**—L. Arrow.

var. **hemistemon** (P. J. Muell.).—**Gal. W.**—Maam. **Ferm.**—near White Island.

R. cariensis Genev.—**Mayo W.**—on Achill near the Sound, and common about Dugort.

R. carpinifolius Wh. & N.—**Gal. W.**—Inishbofin, Maam (old records needing confirmation).

R. incurvatus Bab.—**Lim.**—Askeaton. **Gal. W.**—Clonbur.

R. Lindleianus Lees.—**Gal. W.** and **Mayo E.**—S. of L. Mask.

R. argenteus Wh. and N. *R. erythrinus* auct. brit.—**Gal. W.**—E. of Clonbur. **Mayo E.**—S. of L. Mask. **Mayo W.**—Inishturk.

R. rhamnifolius Wh. and N.—**Lim.**—near Foynes; Castleconnell. **Clare**—Cratloe. **Gal. W.**—Roundstone; L. Inagh; Maam; Clonbur. **Mayo W.**—near the Monastery, Achill.

R. dumnoniensis Bab.—**Gal. W.**—Maam. **Mayo W.**—Inishturk; Mallaranny; near Belmullet.

R. pulcherrimus Neum.—**Lim.**—frequent. **Clare**—Cratloe. **Gal. W.**—Roundstone; Maam; Clonbur. **Mayo E.**—Cong. **Mayo W.**—Westport; Mallaranny; Mullet; frequent on Achill I., Clare I., and Inishturk. **Ferm.**—Bunnahone L.

R. villicaulis Koehl.—**Clare**—Sixmilebridge. **Gal. W.**—Inishbofin; Maam. **Leit.**—L. Allen.

R. Selmeri Lindeb.—**Lim.**—Thornfields; Loghil; Plassy; W. of Foynes. **Clare**—near Kilkee. **Gal. SE.**—Woodford. **Gal. W.** and **Mayo E.**—frequent about Clonbur and Cong. **Mayo W.**—Westport; Newport; Mallaranny.

R. rhombifolius Weihe.—**Mayo W.**—Mallaranny.

R. Godroni Lec. and Lam. *R. argentatus* P.J.M. and auct. brit.—**Lim.**—Limerick; Castleconnell; R. Galey below Rooskagh; Cahirmoyle. **Mayo E.**—Cong.

R. rusticanus Merc. *R. discolor* Wh. and N.—Divisions all. Generally abundant, especially near the sea, but very rare on Achill I.

R. silvaticus Wh. and N.—**Lim.**—by the White R. at Loghil. **Clare**—Inchiquin L.—**Gal. W.**—Maam.

R. myricæ Focke, var. **hesperius** Rogers.—**Lim.**—N. of Castleconnell. **Gal. W.**—abundant at Oughterard, Maam, and Clonbur. **Mayo E.**—plentiful at Cong. A western form in Ireland, elsewhere known only from Carnarvonshire and W. Kent.

R. macrophyllus Wh. and N.—**Lim.**—Plassy; Castleconnell. **Clare**—Doonbeg; Doonass; Cratloe. **Mayo W.**—near Westport. **Sligo**—Sligo. **Leit.**—L. Allen.

subsp. **Schlechtendalii** (Weihe).—**Lim.**—Thornfields; Castleconnell; Plassy. **Clare**—Killaloe; Cratloe (f. *umbrosa*).

R. Questierii Lefv. and Muell.—**Lim.**—Thornfields.

R. Salteri Bab.—**Gal. W.**—Cromlyn (the "Mayo" station of Rogers' *Handbook*).

R. hypoleucus Lefv. and Muell. *R. micans* Gren. and Godr.—**Lim.**—Thornfields.

R. hirtifolius Muell. and Wirtg.—**Gal. W.**—3 miles W. of Cong. **Mayo W.**—Mallaranny. **Leit.**—common round L. Allen.

var. **danicus** (Focke).—**Lim.**—Thornfields. **Mayo E.**—S. of L. Mask.

var. **mollissimus** (Rogers).—**Clare**—Inishmore. **Gal. W.**—Inishmacdara. **Mayo W.**—Mallaranny.

R. iricus Rogers.—This handsome plant is one of the most characteristic brambles of the district, found elsewhere in Ireland only in Kerry and Cork, and believed to be endemic in this country until lately, when it has been detected in the west of Great Britain (Cornwall and four Welsh counties). **Clare**—Inchiquin L.; R. Fergus near Ennis. **Gal. W.**—abundant at Maam, Oughterard, and Clonbur. **Mayo E.**—plentiful at Cong. **Mayo W.**—Newport; Mallaranny; Mullet; Dugort and Keel on Achill; frequent on Clare I.; abundant on Inishturk.

R. pyramidalis Kalt.—**Clare**—Killaloe; Cratloe (f. *umbrosa*). **Gal. W.**—Clonbur. **Mayo E.**—L. Corrib near Cong. **Mayo W.**—Mallaranny; Mullet. **Sligo**—near Dromore West. **Leit.**—Dromahaire; Glenade (f. *hirsutissima*.).

R. leucostachys Sm.—**Clare**—between Kilrush and Moyne Point. **Gal. W.**—Oughterard; Maam; Clonbur. **Gal. NE.**—abundant E. of Galway. **Sligo**—Ox Mtns **Leit.**—L. Allen; L. Scur.

subsp. **leucanthemus** P. J. Muell.—**Gal. W.** and **Mayo E.**—Clonbur.

R. criniger Linton.—**Clare**—near Killaloe. Not known elsewhere in Ireland.

R. cinerosus Rogers.—**Gal. W.**—near Clonbur. **Mayo E.**—S. of Cong.

R. mucronatus Blox.—**Mayo E.**—L. Corrib near Cong. **Mayo W.**—Cashel and Mweelin L. on Achill.

R. mucronatus × pyramidalis.—**Mayo E.**—by L. Corrib near Cong.

R. anglosaxonicus Gelert, subsp. **curvidens** Ley.—**Lim.**—W. of Foynes harbour; Castleconnell.

R. infestus Weihe.—**Lim.**—near Foynes; by the White R. at Loghil.

R. Borreri Bell Salt.—**Gal. W.**—Maam. **Mayo W.**—abundant on Inishturk, often varying towards var. *dentatifolius* Briggs.

R. Drejeri G. Jensen.—**Mayo W.**—Newport.

subsp. **Leyanus** Rogers.—**Mayo W.**—Achill I. near the Sound.

subsp. **dunensis** Rogers.—**Mayo W.**—Dugort. A plant elsewhere in Ireland known from Down and Armagh, and in Great Britain from Merioneth.

R. **radula** Weihe.—**Lim.**—W. of Foynes harbour; Plassy. **Mayo E.**—S. end of L. Mask.

subsp. **anglicanus** Rogers.—**Lim.**—Thornfields.

R. **rudis** Wh. & N.—**Gal. W.**—by L. Corrib SW. of Cong.

R. **oigoclados** Muell & Lefv.—**Clare**—Cratloe.

R. **podophyllus** P. J. Muell.—**Clare**—Cratloe.

R. **Babingtonii** Bell Salt.—**Gal. W.**—between Clonbur and Mount Gable.

R. **mutabilis** Genev.—**Lim.**—behind Ardenoir near Foynes.

R. **Bloxamii** Lees.—**Gal. W.**—by L. Corrib SW. of Cong.

R. **fuscus** Wh. and N.—**Gal. W.** and **Mayo E.**—frequent about Clonbur and Cong.

R. **scaber** Wh. & N.—**Lim.**—Castleconnell. **Gal. SE.**—Woodford. **Gal. W.**—Clonbur; by L. Corrib W. of Cong.

R. **botryeros** Focke.—**Ferm.**—Monawilkin L. near Carrick.

R. **rosaceus** Wh. & N.—**Lim.**—Rinekirk.

var. **hystrix** (Wh. & N.).—**Lim.**—near Foynes. **Mayo W.**—Keel on Achill I

subsp. **adornatus** P. J. Muell.—**Gal. W.**—near Clonbur and Cong.

R. **Koehleri** Wh. & N.—**Lim.**—wood at Foynes. **Clare**—Ballycar. **Gal. W.**—Oughterard; between Clonbur and Mount Gable. **Ferm.**—frequent in SW.

var. **cognatus** (N. E. Brown).—**Gal. W.**—W. side of L. Mask. **Mayo E.**—S. of L. Mask.

R. **dasyphyllus** Rogers. *R. pallidus* Bab.—**Lim.**—Askeaton. **Leit.**—L. Allen; Glenade.

R. **Marshalli** Focke & Rogers.—**Lim.**—behind Ardenoir near Foynes.

R. **serpens** Weihe.—**Clare**—Cratloe.

R. **hirtus** W. & K.—**Gal. NE.**—Clonbrock.

R. **ochrodermis** A. Ley.—**Gal. SE.**—Woodford. As yet the only Irish station.

R. **dumetorum** Wh. & N.—**Lim.**—near Newtown; Foynes; Lucas L.; Castleconnell; Thornfields (near var. *tuberculatus*). **Clare**—Doonass. **Gal. NE.**—rocky fields near Menlo.

var. **ferox** Weihe.—**Gal. W.**—Oughterard; Clonbur.

var. **tuberculatus** Bab.—**Lim.**—wood at Foynes.

var. **fasciculatus** P. J. Muell.—**Gal. W.**—Roundstone.

var. **raduliformis** Ley. — **Lim.** — Ballinacurra estuary. **Clare**—Riverstown Bridge near Corofin.

R. **corylifolius** Sm.—**Lim.**—not rare in N. **Clare**—Inishmore.

Gal. W.—Roundstone. **Mayo E.**—L. Carra; Cong. **Mayo W.**—Mullet.

var. **cyclophyllus** Lindeb. Var. *conjungens* Bab.—**Lim.**—near Foynes; Askeaton. **Mayo E.**—between Clonbur and Cong. **Mayo W.**—Leam L. on Mullet.

R. Balfourianus Blox.—**Mayo E.**—2 miles S. of Cong.

R cæsius L. DEW-BERRY. — **Lim.** — Foynes; Cahirmoyle; Castleconnell; Plassy; Corbally. **Clare**—abundant. **Gal. SE.**—L. Fingall; Castle Taylor; Ballinasloe; L. Derg. **Gal. W.**—L. Corrib. **Gal. NE.**—Clonbrock. **Mayo E.**—abundant on L. Mask; L. Carra. **Mayo W.**—Inishkea. **Ferm.**—L. Erne.

var. **tenuis** (Bell-Salt.).—**Mayo E.**—south of L. Mask.

R. cæsius × dumetorum. — **Clare** — abundant along the Shannon near Limerick.

R. saxatilis L. STONE BRAMBLE. — Hills, lake shores and limestone pavements. Locally abundant. Divisions all, abounding on the bare limestones, and the shores of Loughs Derg, Ree, Corrib, Mask, Carra, Conn, and Lower L. Erne. From 1650 feet in Sligo and Mayo down to sea-level.

Dryas octopetala L. MOUNTAIN AVENS. Leaċín.—One of the most characteristic plants of the western limestone pavements, occurring in immense profusion from sea-level upwards, and having its main stronghold in Burren, where it grows in sheets over many square miles. See plate 4. It has a second head-quarters on the limestone hills of the north-west, in Sligo, Leitrim and Fermanagh. Elsewhere in Ireland it is found only in W. Donegal, Londonderry, and Antrim — a single mountain station in each. **Clare**—abundant in Burren from sea-level to summits, spreading SE. as far as Muckanagh L. **Gal. SE.**—L. Fingall; Castle Taylor; Ardrahan; common in Kinvarra district. **Gal. W.**—limestone drift banks at sea-level at Gentian Hill and Barna Head; bluffs at Ballycuirke L.; metamorphic rocks on Lisoughter near Recess. **Gal. NE.**—Castle Lambert. **Sligo** and **Leit.**—abundant on the Ben Bulben range, 800–1220 feet. **Ferm.**—abundant on Knockmore; Poulaphuca. All the stations are on limestone rocks except where otherwise stated.

var. **pilosa** Bab.—**Clare**—Black Head. **Gal. SE.**—Castle Taylor.

Geum urbanum, L. WOOD AVENS.—Divisions all. Common.

G. rivale L. WATER AVENS.—Divisions all *except Gal. NE.*, but irregularly distributed. Common in N. Clare and Ferm.

Frequent in Gal. SE.; also in E. Sligo, where it is found on the summits of dry limestone mountains. To 2400 feet in W. Mayo.

G. rivale × **urbanum**. *G. intermedium* Ehrh.—**Gal. SE.**—Garryland, **Mayo E.**—Ballinrobe. **Leit.**—Glenade; Annagh-early L. **Ferm.**—White Island on L. Erne.

Fragaria vesca L. Wild Strawberry. Súg ṫalṁan (Ground fruit).—Divisions all. Common.

Potentilla Fragariastrum Ehrh. *P. sterilis* Garcke. Barren Strawberry.—Divisions all. Common.

P. Tormentilla Neck. *P. erecta* Hampe. Tormentil.—Divisions all. Common at all elevations, to the tops of the highest hills.

P. procumbens Sibth. Trailing Tormentil.—Divisions all. Frequent.

P. procumbens × **Tormentilla**. *P. suberecta* Zimm.—**Gal. W.** and **Mayo E.**—About Clonbur. **Leit.**—Ballinamore; Lurganboy. **Ferm.**—Newtownbutler.

P. reptans L. Creeping Cinquefoil.—Divisions all. Local, but generally frequent.

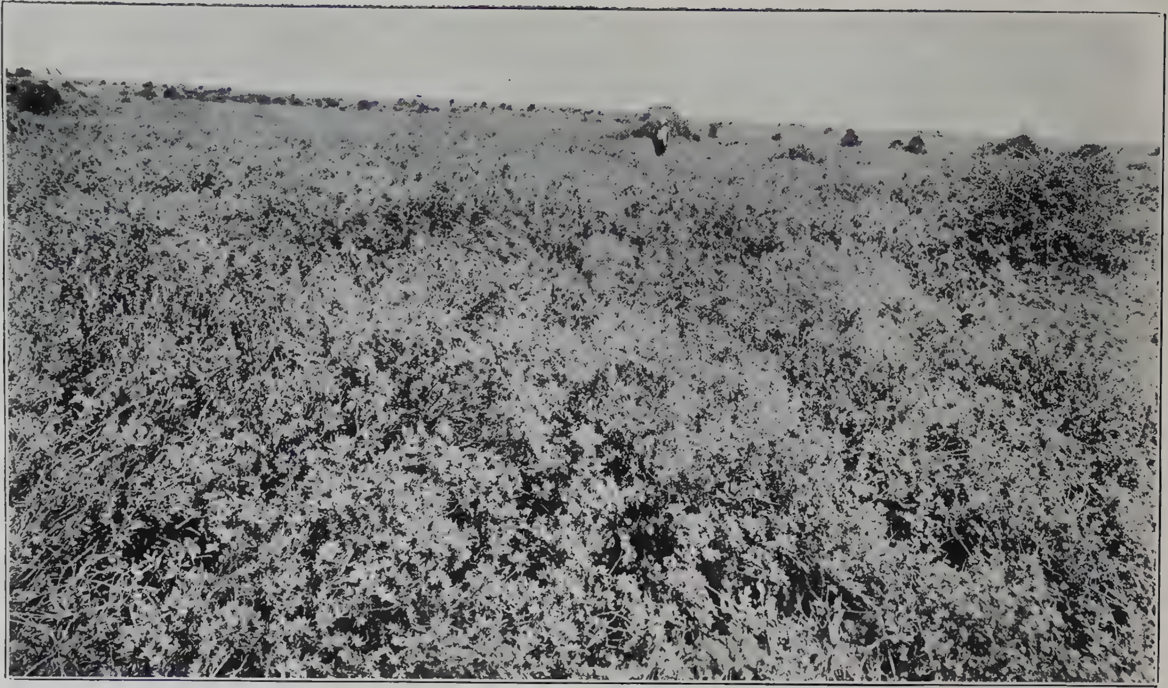
P. Anserina L. Silverweed.—Divisions all. Common.

P. fruticosa L. Shrubby Cinquefoil.—Very local, and confined in Ireland to about 40 miles of the western edge of the Limestone Plain, in Clare, Gal., and Mayo. **Clare**—locally abundant in Burren, occurring mainly in the Rock-forest district, in the valley behind Ballyvaughan, and in the Formoyle valley south of Black Head. **Gal. W.**—Shore of L. Corrib below Lemonfield near Oughterard, 1804—not seen since. **Gal. NE.**—near Headford, 1836—not seen since. **Mayo E.**—Plentiful in two or three fields on the shore of L. Corrib between Ballycurrin and Castletown; shore at Castletown. Generally abundant where it occurs, sometimes almost entirely usurping the ground over an acre or two, as behind Ballyvaughan. "Flowers twice, first towards the end of spring with small flowers, again in early autumn, when the flowers are double the size"—F. J. Foot.

P. palustris Scop. *Comarum palustre* L. Marsh Cinquefoil.—Divisions all. Frequent.

Alchemilla arvensis Scop. Parsley Piert.—Divisions all. Common.

A. vulgaris L. Lady's Mantle. Bratóg Muire (St. Mary's Cloak).—Divisions all. To 1800 feet in Sligo and on Maam Turk. Frequent in its various forms, the three segregates being nearly equally common. *A. pratensis* Pohl. is recorded



POTENTILLA FRUTICOSA AT BALLYVAUGHAN, CO. CLARE.
An almost continuous low growth, about two feet in height, extending over several acres of flat heathy limestone ground. Flowering just beginning. May, 1907.

R. Welch, Photo.

To face p. 14

from Clare, Gal. NE., Rosc., Mayo W., Sligo, Leit., Ferm.; *A. alpestris* Pohl. from Lim., Gal. W., Mayo E. and W., Sligo, Leit., Ferm.; and *A. filicaulis* Buser from Lim., Gal. SE., W., and NE., Rosc., Mayo E. and W., Leit.[1]

Agrimonia Eupatoria L. AGRIMONY.—Divisions all. Frequent.

A. odorata Mill. FRAGRANT AGRIMONY.—Rare, and calcifuge in its distribution. **Lim.**—Glenastar; Galey R.; Doon. **Clare**—W. of Killadysert. **Gal. SE.**—Rossmore. **Gal. W.**—frequent about Roundstone and Clifden; Killery mouth; L. Mask. **Mayo W.**—Tourmakeady; NW. shore of L. Conn; Bartragh I. **Sligo**—Strandhill. **Leit.**—common by L. Gill.

Poterium Sanguisorba L. SALAD BURNET.—Southern half of the district; calcicole and local. **Lim.**—abundant on the Mullough limestones. **Clare**—near Ennis; abundant in Burren and Aran. **Gal. SE.**—Moyode; frequent in SW. **Gal. NE.**—Merlin Park.

P. officinale A. Gray. *Sanguisorba officinale* L. GREAT BURNET. —**Mayo W.**—abundant on the stony shores of L. Conn and L. Cullin, on both limestone and non-calcareous rocks.

Elsewhere in Ireland confined to a few stations in the north-east.

Rosa spinosissima L. *R. pimpinellifolia* L. BURNET ROSE.—Divisions all. Frequent. To 1550 feet in W. Mayo, and 1300 feet on Ben Bulben range.

R. involuta Smith. UNEXPANDED ROSE.—**Lim.**—White R. near Loghil. **Gal. W.**—between Clonbur and Cong. **Mayo E.**—L. Carra.

var. **Doniana** (Woods).—**Clare**—Rineanna Point. **Mayo E.**—S. of L. Mask.

var. **Nicholsonii** Crépin.—**Ferm.**—N. shore of Lower L. Macnean.

R. hibernica Temp., var. **glabra** Baker. IRISH ROSE.—**Lim.**—by the White R. near Loghil. The other Irish stations for this rose are all in the north-east, where it was first found and described by John Templeton.[2]

R. mollis Smith. *R. mollissima* Willd. SOFT-LEAVED ROSE.—Rare. **Gal. SE.**—Castle Taylor. **Gal. NE.**—Terryland. **Ferm.**—Devenish I.

---

[1] See E. F. Linton: *Alchemilla vulgaris* in Ireland. *Journ. Bot.*, xxxviii., 132–3. 1900, and *Irish Nat.*, ix., 92–3. 1900; and R. Ll. Praeger: Gleanings in Irish Topographical Botany. *Proc. Roy. Irish Acad.*, xxiv., Sect. B, 67–68. 1902.

[2] See JAMES BRITTEN: Note on Rosa hibernica. *Journ. Bot.*, xlv., 304–5; and *Irish Nat.*, xvi., 309. 1907.

R. tomentosa Smith. DOWNY-LEAVED ROSE.—Divisions all. Frequent.

var. **subglobosa** (Smith).—**Lim.**—Loghil; R. Galey.

var. **scabriuscula** (Smith).—**Leit.**—Lurganboy. **Ferm.**—by L. Erne.

†**R. rubiginosa** L. *R. Eglanteria* Huds. SWEET BRIAR.—Rather rare. **Lim.**—Foynes; "crags" at Ballyclough; Castleconnell. **Clare**—Clare Castle; islands in R. Fergus. **Gal. SE.**—Portumna. **Gal. NE.**—3 miles S. of Tuam. **Ferm.**—Portora; Florencecourt.

R. sepium Thuill. *R. agrestis* Savi. BUSH ROSE.—**Gal. SE.**—L. Derg near Portumna. **Mayo E.**—common by L. Corrib S. of Cong.

R. dumetorum Thuill., var. **frondosa** (Baker).—**Lim.**—frequent in Shanid barony.

var. **urbica** (Léman).—**Lim.**—Thornfields; frequent in Shanid barony.

R. Borreri Woods, f. **arvatica** (Baker).—**Lim.**—frequent in Shanid barony.

R. canina L. DOG ROSE.—Divisions all. Common.

var. **lutetiana** (Léman).—**Lim.**—near Foynes; f. *andegavensis* near Tarbert. **Gal. W.** and **Mayo E.**—Clonbur.

var. **sphærica** (Gren.).—**Lim.**—Mount Trenchard.

var. **senticosa** (Ach.).—**Clare**—Ballyvaughan.

var. **dumalis** (Bechst.).—**Lim.**—common in Shanid barony. **Gal. W.** and **Mayo E.**—Clonbur.

R. glauca Vill., var. **subcristata** (Baker).—**Lim.**—Ardagh; Shanagolden; near Foynes. Elsewhere in Ireland known only in the north-east.

R. stylosa Desv., var. **systyla** (Bast.).—**Lim.**—frequent in the Foynes district. The plant has all the appearance of a native here. The only other Irish records, from about Cork, have been viewed with much suspicion by modern botanists.

R. arvensis Huds. TRAILING ROSE.—Divisions all *except Mayo E.* Frequent in south Clare, south Gal. SE., Leit., Ferm. Rare in Gal. W. and NE., Mayo W., Sligo.

Pyrus Aria Ehrh. WHITE BEAM.—Chiefly on limestone rocks. Local. **Lim.**—Curragh Chase; Pallasgreen. **Clare**—Carrowgar Bay on L. Derg. **Gal. SE.**—frequent in the west, and occasionally on L. Derg. **Gal. W.**—Clonbur is the only definite record. **Gal. NE.**—Knockmae; Donamon; frequent along L. Corrib. **Rosc.**—St. John's Wood on L. Ree; possibly introduced elsewhere. **Mayo E.**—Claremorris; L. Mask; L. Carra. **Mayo W.**—L. Conn. **Sligo**—frequent in eastern half to 920 feet. **Leit.**—L. Gill; N. side of Glenade.

var. **rupicola** Syme.—Recorded from Glencar in Leit. Perhaps frequent.

P. Aucuparia Ehrh. MOUNTAIN ASH; ROWAN. Caorṫainn (Berry Tree).—Divisions all. Frequent. To 2300 feet on Twelve Bens, and 1850 feet on Ben Bulben range.

P. Malus L. CRAB APPLE.—Divisions all. The wild form, var. *acerba* (DC.) (*sylvestris* L.), which is indigenous in many places, is noted from all divisions *except Clare*; the introduced form, var. *mitis* (Wallr.), from all *except Clare, Rosc., and Mayo W.*

Cratægus Oxyacantha L. HAWTHORN; WHITE-THORN. Sgeaċ ġeal (White Thorn).—Divisions all. Common. To 1200 feet on Ben Bulben range. *C. oxyacanthoides* Thuill., and *C. monogyna* Jacq. both occur, but their range has not been worked out.

SAXIFRAGEÆ.

Saxifraga oppositifolia L. PURPLE SAXIFRAGE.—Local on the higher mountain ranges. **Gal. W.**—Ben Lettery; Lisoughter down to 450 feet; Muckanaght; Maumeen down to 910 feet; Kylemore Mtn. abundant. **Mayo W.**—Loughty Mtn. up to 2400 feet; Cushcamcarragh; NW. of Bengorm; Clare I. **Sligo** and **Leit.**—frequent on the Ben Bulben range, 800 to 1600 feet.

S. nivalis L. ALPINE CLUSTERED SAXIFRAGE.—**Sligo**—damp rifts in the cliffs of Annacoona at the head of Gleniff, at about 1200–1950 feet. First found there by John Wynne of Hazelwood in 1837; about 30 plants seen by Barrington and Vowell on their exploration of the Ben Bulben range in 1884; refound by Miss Wynne at the base of the same cliff in 1908. The only Irish station. The plant grows there among one of the largest colonies of alpines to be found in the Ben Bulben district, including abundance of *Arenaria ciliata*.

S. stellaris L. STARRY SAXIFRAGE.—One of the most frequent of Irish alpine plants, but strictly avoiding the limestone, and therefore local in the west. **Lim.**—Galtymore; Carrignabinnian. **Gal. W.**—frequent about the Twelve Bens; rare at Maam Turk and the Partry Mtns. **Mayo W.**—frequent on the higher hills, 1050–2450 feet. **Ferm.**—N. side of Cuilcagh at 1800 feet.

S. umbrosa L. LONDON PRIDE. Cabáiste ṁaḋa ruaiḋ (Fox's Cabbage). Cabáiste daoine maiṫe (Good People's Cabbage).—Cliffs, banks, and rocks. Local in its horizontal range, owing to its strongly calcifuge proclivities, but ubiquitous as regards vertical distribution, flourishing equally at sea-level (on sea-cliffs in Achill I.) and on the tops of the highest mountains. In some places it even invades man's domain, and on Inishturk is one of the first weeds to take possession of the walls and roofs of deserted cottages. The widest-ranging of the "Cantabrian type" plants in Ireland, being spread along the south and west coasts from Co. Waterford to Co. Donegal (see fig. 5, p. 26). Unknown in Great Britain, and on the continent of Europe confined to the south-west. (**Lim.**—though not rare on the Galtees, has not been definitely recorded from the portion of the range that lies in this county.) **Gal. W.**—frequent except on the limestone in the east. **Mayo E.**—Glendaduff in Slieve Gamph. **Mayo W.**—frequent throughout, including the larger islands. See plate 5.

The vars. *serratifolia* Don and *punctata* Don are connected by many intermediates with the type, and in Ireland at least cannot be regarded as distinct.

S. **Hirculus** L. YELLOW MARSH SAXIFRAGE.—**Mayo W.**—bog west of Belderrig. A very rare plant in Ireland, found mostly in low-level bogs.

S. **aizoides** L. YELLOW MOUNTAIN SAXIFRAGE.—Mountain rocks in the northern part of the district. **Sligo**—Knockachree in the Ox Mountains; abundant on the Ben Bulben range, 350–1600 feet; plentiful at sea-level on N. side of Rosses Point. **Leit.**—Glenade; Faughrey Mtn. **Ferm.**—Poulaphuca, 250–1000 feet. Elsewhere in Ireland confined to Donegal and N. Antrim.

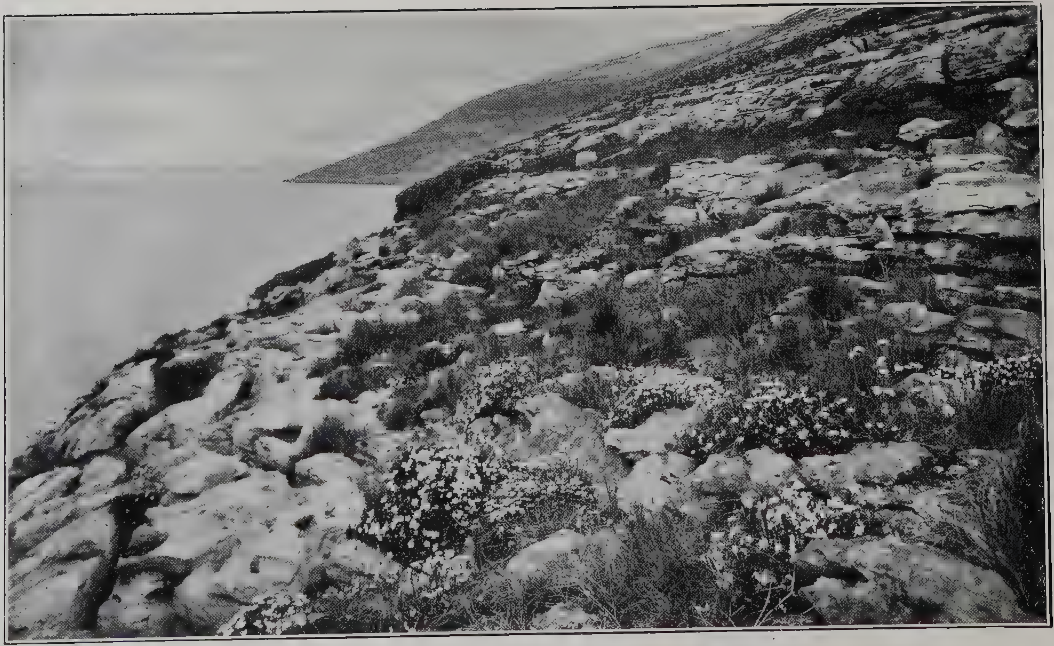
S. **tridactylites** L. RUE-LEAVED SAXIFRAGE.—Chiefly on limestone rocks and limy sea-sands. Divisions all *except Ferm.*; decreases northwards. In Clare is out of flower in summer only.

‡S. **granulata** L. MEADOW SAXIFRAGE.—**Lim.**—wild ground in Glenstal.

S. **hypnoides** L. *sensu stricto*. *S. gemmifera* Syme. MOSSY SAXIFRAGE.—Confined to the limestone, and local thereon. **Clare**—throughout Burren and Aran, extending S. to Newmarket. **Gal. SE.**—Castle Taylor; Garryland. **Sligo**—frequent on hills of eastern half to 1800 feet. **Leit.**—both sides of Glenade. **Ferm.**—frequent on hills in SW.

S. **sponhemica** Gmel.—**Lim.**—Carrignabinnian in the Galtees. Like the last, has in Ireland a south-western and northern range, but differs from it in having no station on the limestone.

S. **decipiens** Ehrh. *S. rosacea* Mœnch.—**Mayo W.**—plentiful on the sea-scarp of Croaghmore on Clare I., 200–1300 feet. Elsewhere in Ireland in Kerry only.



Saxifraga Sternbergii at Black Head, Co. Clare.

It is accompanied here by *Dryas octopetala*, *Geranium sanguineum*, *Arctostaphylos Uva-ursi*, *Gentiana verna*, *Habenaria intacta*, *Sesleria cærulea*, &c. About 50 feet above sea level. The hills rise to 1,000 feet.

R. Welch, Photo.

To face p. 145.

S. Sternbergii Willd.—**Clare**—abundant at Poulsallagh and Black Head in Burren; Inishmore. This plant, elsewhere in Ireland confined to S. Kerry, S. Tipperary, and W. Donegal, is unknown in Great Britain.

S. grœnlandica Engler.—**Gal. W.**—Muckanaght in the Twelve Bens.

Chrysosplenium oppositifolium L. GOLDEN SAXIFRAGE.—Divisions all. Common. To 2100 feet on Mweelrea, and 1600 feet on Ben Bulben range.

Parnassia palustris L. GRASS OF PARNASSUS.—Divisions all. Distinctly calcicole; while frequent in all the limestone areas, it is absent from or rare in such districts as S. Lim., W. Gal. and W. Mayo (excepting their east margin), W. Sligo, and S. Leit., where other rocks prevail. To 1450 feet on Ben Bulben range.

§**Ribes Grossularia** L. GOOSEBERRY.—**Gal. W.** and **Mayo E.**—south of L. Mask.

§**R. rubrum** L. RED CURRANT.—**Lim.**—near Castleconnell. **Leit.**—cliffs of Glenade.

§**R. nigrum** L. BLACK CURRANT.—**Lim.**—moory ground near Castleconnell.

CRASSULACEÆ.

Cotyledon Umbilicus-Veneris L. PENNYWORT.—Divisions all, having a calcifuge tendency. Usually frequent.

Sedum Rhodiola DC. *S. roseum* Scop. ROSE-ROOT.—Wet mountain rocks and sea-cliffs, being a very characteristic plant of the latter, on the islands particularly. **Clare**—cliffs of Moher; sea-cliffs on Inishmore. **Gal. W.**—frequent on the mountains. **Mayo W.**—frequent on mountains and sea-cliffs, islands included. **Sligo**—Lugnagall; frequent on the Ben Bulben range. **Leit.**—Glenade. **Ferm.**—Poulaphuca. From sea-level in many places to 2600 feet on Mweelrea.

‡**S. Telephium** L. ORPINE; LIVE-LONG.—Banks and stony places in the zone of cultivation. Probably nowhere native. **Clare**—Kilfenora; local in Burren. **Gal. SE.**—Woodford. **Gal. W.**—*Oughterard; *Maam; Lemonfield. **Sligo**—Ben Bulben; Hazelwood; Lissadill.

*__S. album__ L. WHITE STONECROP.—Old walls and rocks. A garden plant run wild. **Lim.**—Mullough; Foynes; Castleconnell. **Clare**—Rineanna Point in R. Fergus; Lax weir near Limerick. Gal. SE.—Loughrea. **Sligo**—sea rocks near Rosses Point. Increases very easily on account of its great vitality and readiness in rooting.

S. anglicum Huds. English Stonecrop.—A rather calcifuge plant, and found chiefly near the coast, though avoiding sea sands. Divisions all *except Gal. SE., Leit., and Ferm.* Very rare in Gal. NE., Rosc., Mayo E., and Sligo. Generally frequent only in W. Gal. and W. Mayo.

S. acre L. Wall Pepper.—Divisions all. Mostly frequent, but rarer in W. Gal. and W. Mayo. Often planted about cottages in inland districts.

***S. reflexum** L. Crooked Stonecrop.—Run wild on walls. **Lim.**—Kilmallock Abbey. **Clare**—Newmarket. **Ferm.**—Poulaphuca.

§**Sempervivum tectorum** L. Houseleek.—Divisions all. Planted on cottage roofs as a charm against fire.

DROSERACEÆ.

Drosera rotundifolia L. Round-leaved Sundew.—Divisions all. Frequent. To 1100 feet in W. Mayo.

D. anglica Huds. Great Sundew. Ꝺꞃuıċꞇín Móna (Bog-dew).—Divisions all. Its distribution follows that of low-level peat bogs.—**Lim.**—Gardenhill; Knockfinish; Castleconnell. **Clare**—frequent in SW.; Lisdoonvarna; not rare in centre. **Gal. SE.**—frequent in E., rare in W. **Gal. W.**—common. **Gal. NE.**—frequent. **Rosc.**—frequent in S., rare in N. **Mayo E.**—frequent. **Mayo W.**—common; ascends to 750 feet. **Sligo**—widespread, rare. **Leit.**—rare in N., frequent in extreme S. **Ferm.**—Belleek; Florencecourt district; frequent on hills SW. of Upper L. Erne.

D. anglica × rotundifolia. *D. obovata* M. and K.—**Clare**—bog north of Carrigaholt.

D. intermedia Hayne. *D. longifolia* L. Long-leaved Sundew.—Divisions all *except Lim.* Like the last, but prefers wetter ground, often growing among floating Sphagnum. **Clare**—Slieve Elva at 1000 feet; Ballyogan L.; Monmor district; near Killadysert. **Gal. SE.**—Woodford; Castle Taylor. **Gal. W.**—common. **Gal. NE.**—frequent. **Rosc.**—Mount Talbot; Cloghan L. **Mayo E.**—frequent. **Mayo W.**—common, ascending to 750 feet. **Sligo**—east of Cliffony. **Leit.**—Drumod; Uragh L. **Ferm.**—Florencecourt district; S. of Belleek.

Differs in growth from the other species in being distinctly caulescent, the stem often lengthening annually from 1 to 2 inches.

HALORAGEÆ.

Hippuris vulgaris L. Mare's-tail.—Divisions all. Common.

Myriophyllum verticillatum L. Whorled Water-Milfoil.—Pools and drains on the limestone. Local. **Lim.**—frequent about Limerick; Gardenhill. **Clare**—N. of Drummeen Castle. **Gal. SE.**—Woodford; Portumna. **Gal. W.**—L. Corrib below Carn Seefin; Ballycuirke L. **Gal. NE.**—frequent. **Rosc.**—north and south, local. **Mayo E.**—Hollymount; L. Carra.

M. spicatum L. Spiked Water-Milfoil.—Divisions all. Generally distributed, but not common.

M. alterniflorum DC. Alternate-flowered Water-Milfoil.—Divisions all. Commoner than the last. To 1330 feet in Sligo, and 1205 feet on Mweelrea.

Callitriche stagnalis Scop. *C. platycarpa* Kuetz. Water-Starwort.—Divisions all *except Rosc.* Probably common everywhere. To 1370 feet in Mayo.

var. **serpyllifolia** Lönnroth.— **Gal. W.**—Maam. **Mayo W.**—Inishturk.

C. hamulata Kuetz. *C. intermedia* Hoffm. *C. pedunculata* DC.—Calcifuge. Probably common off the limestone. **Lim.**—Rinekirk; Newbridge; Glenstal. **Gal. W.**—local. **Mayo W.**—frequent, ascending to 1205 feet. **Ferm.**—Hay I.; near Poulaphuca; Carrick L.

C. obtusangula Le Gall.—Perhaps frequent. **Lim.**—Ballyclough. **Mayo E.**—N. of Claremorris. **Mayo W.**—west of Castlebar; Newport.

C. autumnalis L. Autumnal Water-Starwort. — Very local. **Gal. SE.**—north of Gort. **Mayo E.**—Cong; east of Foxford. **Sligo**—abundant in the river at Sligo. **Ferm.**—Blayney Bay on Lower L. Erne.

LYTHRARIEÆ.

Peplis Portula L. Water Purslane.—Calcifuge. Generally frequent off the limestone. Divisions all *except Gal. SE. and Rosc.*

Lythrum Salicaria L. Purple Loosestrife. Creaċtaċ (Wound plant ?).—Divisions all. Common. Especially abundant in wild peaty districts in the extreme west.

§ **L. hyssopifolia** L. Hyssop-leaved Grass-poly.—**Lim.**—casual at Limerick.

ONAGRARIEÆ.

Epilobium angustifolium L. Rose Bay.—**Lim.**—Glenastar waterfall. **Mayo W.**—cliffs on Slievemore, Achill I., at 1800 feet. **Sligo**—near Carrowkeel Mtn. **Leit.**—Glenade; Truskmore; Arroo Mountain; 1000–1650 feet. **Ferm.**—frequent on the Poulaphuca cliffs. A northern plant in Ireland, with outlying stations in Wicklow and the divisions named.

E. hirsutum L. Great Willow-herb.—Divisions all. Common.

E. parviflorum Schreb. Small-flowered Willow-herb.—Divisions all. Common.

E. montanum L. Smooth Willow-herb.—Divisions all. Common. To 1600 feet in Ben Bulben district, and 1500 feet on Mweelrea.

E. montanum × obscurum.—**Mayo W.**—Inishturk.

E. obscurum Schreb. Square-stalked Willow-herb.—Divisions all. Common.

E. obscurum × palustre.—**Gal. W.**—Oughterard.

E. palustre L. Marsh Willow-herb.—Divisions all. Frequent. To 1500 feet on Ben Bulben range.

E. alsinefolium Vill. Mountain Willow-herb.—**Leit.**—abundant on dripping rocks and by rills for ½ mile, about 800–1200 feet elevation, on low cliffs facing and E. of Crumpaun, Glenade. The only Irish station.[1]

§**Œnothera biennis** L. Evening Primrose.—**Lim.**—casual at Limerick.

Circæa lutetiana L. Enchanter's Nightshade.—Divisions all. Common.

C. alpina L. Alpine Enchanter's Nightshade.—North only. **Sligo**—common about L. Gill; Glencar; Lissadill; Ben Bulben. **Leit.**—Glenade; L. Gill; L. Melvin; Arroo Mtn.; from 50 feet by L. Gill to 1600 feet. **Ferm.**—common on Lower L. Erne; frequent on the hills SW. of it.

Several old records from Gal. W. remain unconfirmed. Has in Ireland, as in Great Britain, a well-defined northern range.

var. **intermedia** (Ehrh.).—**Leit.**—Glencar. **Ferm.**—banks of the Erne near Enniskillen.

§**Clarkia concinna** Greene.—**Lim.**—casual at Limerick.

---

[1] R. M. Barrington, *Journ. Bot.*, xxii., 247. 1884, and *Irish Nat.*, xiv., 260–1. 1905. R. Ll. Praeger, *Irish Nat.*, xiv., 223. 1905.

UMBELLIFERÆ.

Hydrocotyle vulgaris L. MARSH PENNYWORT.—Divisions all. Common.

Eryngium maritimum L. SEA HOLLY. Cuileann tráġa (Strand Holly).—Sandy shores. Not nearly so common as on E. side of Ireland. **Clare**—frequent but local. **Gal. SE.**—Kilcolgan. **Gal. W.**—Dog's Bay and several places westward. **Mayo W.**—Keel strand and Valley strand on Achill; Mullet; N. Inishkea.

Sanicula europæa L. WOOD SANICLE.—Divisions all. Frequent.

Conium maculatum L. HEMLOCK.—Divisions all. Frequent, especially about villages near the sea.

‡**Smyrnium Olusatrum** L. ALEXANDERS.—A probably introduced species, local in West Ireland. Divisions all *except Gal. W.*, *Rosc.*

Apium graveolens L. WILD CELERY.—A local salt-marsh plant, occurring in all maritime divisions *except Leit.*

A. nodiflorum Reichb. fil. PROCUMBENT WATER-PARSNEP.—Divisions all. Common.

var. **ocreatum** DC.—**Gal. W.**—S. side of L. Mask. **Mayo W.**—Westport.

A. inundatum Reichb. fil. LEAST MARSHWORT.—Divisions all. Frequent.

var. **Moorei** Syme.—**Lim.**—Shannon at Castleconnell. **Clare**—lakelet SW. of Glanquin Mtn. **Gal. NE.**—R. Clare below Weir Bridge near Tuam.

Cicuta virosa L. WATER-HEMLOCK. — Inland lakes and ditches in N. half of district. **Gal. NE.**—near R. Suck at Donamon. **Rosc.**—Rockville; L. Key; Lanesborough. **Sligo**—Feenagh L. **Leit.**—frequent in S. half. **Ferm.**—Belleisle; Crum; Kinarla; W. of Clones.

***Petroselinum sativum** Hoffm. *Carum Petroselinum* Benth. PARSLEY.—Naturalized on rocks and old buildings. **Lim.**—Askeaton; Limerick. **Clare**—Canon I.; Dromore Castle. **Gal. W.**—Aughnanure Castle near Oughterard. **Mayo W.**—Moyne Abbey. **Sligo**—L. Dargan Castle. **Ferm.**—Crum Castle.

***Carum Carvi** L. CARAWAY. — Little more than casual. Recorded from Lim., Gal. NE., Rosc., Mayo E. and W., Sligo, Ferm.

Sium latifolium L. BROAD-LEAVED WATER-PARSNEP.—Riversides and ditches in the Shannon and Erne basins, outside of which it is not now known to occur in Ireland. **Lim.**—

Shannon Fields near Limerick. **Clare**—Ennis; Corofin; Dromore L.; L. Derg. **Gal. SE.**—Portumna; L. Derg near Woodford. **Gal. NE.**—R. Suck near Ahascragh and at Ballinasloe; Tuam. **Rosc.**—Ballinasloe; Carrick-on-Shannon; L. Ree. **Ferm.**—common round Enniskillen; Ballycassidy R.; Finn R. near Redhill.

S. angustifolium L. *S. erectum* Huds. NARROW-LEAVED WATER-PARSNEP.—Ditches and marshes. Divisions all; local.

‡**Ægopodium Podagraria** L. GOUTWEED.—Divisions all. Frequent.

Pimpinella Saxifraga L. BURNET-SAXIFRAGE.—Frequent, sometimes local. Divisions all *except Mayo W.*, *Leit.*

P. magna L. *P. major* Huds. GREATER BURNET-SAXIFRAGE.—Extremely local. **Lim.**—Kilmallock; abundant in N. **Clare**—Scattery I.; Labasheeda; Canon I.; local in Burren and Aran. **Gal. W.**—abundant from Moycullen to Oughterard. **Gal. NE.**—near Kilbeg ferry. **Mayo E.**—common about Cong; Foxford. **Mayo W.**—west of Castlebar.

Conopodium denudatum Koch. *C. majus* Loret. *Bunium flexuosum* With. PIG-NUT.—Divisions all. Common. To 1300 feet on Ben Bulben range.

***Myrrhis odorata** Scop. SWEET CICELY.—A garden escape, now naturalized. **Gal. W.**—abundant at Ashford. **Sligo**—Ballysadare; Carrowmore; Beltra. **Leit.**—Ballinamore.

Chærophyllum temulum L. ROUGH CHERVIL.—Decreases westward in Ireland. Rare in our district. **Lim.**—L. Gur. **Clare**—S. of Newmarket; W. of Corofin; Finnevara. **Ferm.**—abundant at Lisgoole.

Scandix Pecten-Veneris L. SHEPHERD'S NEEDLE.—Cultivated fields. Divisions all *except Mayo W.*, but seldom common.

Anthriscus vulgaris Bernh. BEAKED PARSLEY.—A light-soil species, rare in W. Ireland, about towns and buildings chiefly. **Lim.**—Askeaton. **Clare**—Inishmore. **Gal. SE.**—†Woodford. **Gal. NE.**—Dunmore. **Rosc.**—Rindown Castle and Galey on L. Ree; Athlone. **Mayo E.**—Ballinrobe; Foxford. **Mayo W.**—Foxford.

A. sylvestris Hoffm. COW-PARSLEY.—Divisions all. Common. To 2100 feet on Mweelrea, and 1700 feet on Ben Bulben range.

†**Fœniculum officinale** All. *F. vulgare* Mill. FENNEL.—Nowhere undoubtedly native. Southern half of the district, rare. **Lim.**—Askeaton, looking wild; Barracks; Foynes. **Clare**—near Quin Abbey. **Gal. W.**—*near Galway.

Crithmum maritimum L. SAMPHIRE.—Sea rocks and boulder beaches. Local. **Lim.**—Shannon above Kilrush. **Clare**—Burren and Aran, abundant. **Gal. W.** — occasionally. **Mayo W.**—Mullet and on all larger islands. **Sligo** — Rosses Point.

Œnanthe fistulosa L. Common Water-Dropwort.—Lowland streams and marshes. **Lim.** — frequent about Limerick. **Clare**—Ardsollus R.; Ennistymon. **Gal. SE.**—Portumna. **Gal. NE.**—Clare R. near Tuam. **Ferm.**—mouth of Ulster canal.

Œ. Lachenalii C. Gmel. Seaside Dropwort.—Salt-marshes. Divisions all *except Rosc.*, *Mayo E.*, *Leit.*, *Ferm.*

Œ. crocata L. Hemlock Water-Dropwort.—Rather calcifuge. Divisions all *except Rosc.* Frequent but local.

Œ. Phellandrium Lamk. *Œ. aquatica* Poir. Horsebane.—Lowland watery places. Divisions all.

Æthusa Cynapium L. Fool's Parsley.—Divisions all *except Mayo W.* Generally frequent.

Angelica sylvestris L. Wild Angelica.—Divisions all. Common. To 2100 feet in W. Mayo and 1700 feet in Ben Bulben district.

*__Peucedanum sativum__ Benth. *Pastinaca sativa* L. Wild Parsnep.—Run wild, and sometimes naturalized in dry places. **Lim.** — Askeaton; Foynes. **Clare** — Doonbeg; Ballynacally; Killadysert; Inishmore. **Gal. SE.**—Castle Taylor. **Gal. W.** — Oughterard; Ballyconneely; Bunowen. **Rosc.**—eskers W. of Athlone. **Mayo W.**—Newport. **Ferm.**—Drumskew.

§**P. Ostruthium** Koch. Masterwort.—**Clare**—by R. Fergus near Ballynacally.

Heracleum Sphondylium L. Cow-Parsnep; Hogweed.—Divisions all. Common. To 1600 feet in Ben Bulben district.

Daucus Carota L. Wild Carrot.—Divisions all. Common.

Caucalis Anthriscus Huds. *Torilis Anthriscus* Gærtn. Upright Hedge-Parsley.—Divisions all. Common.

C. nodosa Scop. *T. nodosa* Gærtn. Knotted Hedge-Parsley.—Local. **Lim.**—frequent in N. **Clare**—frequent in N., rare in S. except on Fergus islands. **Gal. SE.** and **NE.**—not rare. **Gal. W.** — Roundstone and frequent westward. **Rosc.**—Castle Sampson.

ARALIACEÆ.

Hedera Helix L. Ivy. Eiḋean.—Divisions all. Common. To 1740 feet on Croaghpatrick.

CORNACEÆ.

Cornus sanguinea L. Cornel; Dogwood.—**Lim.**—abundant at Askeaton and Mullough. **Clare**—Ennis; frequent in Burren and three Isles of Aran. **Gal. SE.**—L. Fingall; north of Gort. **Rosc.**—†Mote Park. **Sligo**—Keshcorran; Seefin to 900 feet; Goat I. in L. Gill. **Leit.**—L. Gill; ‡Rinn L. On limestone rocks and cliffs except at Mote Park and Rinn L., where it is of doubtful standing.

CAPRIFOLIACEÆ.

Sambucus nigra L. Elder.—Divisions all. Appears truly native in limestone districts.

var. **laciniata** L.—**Clare**—near Ennistymon; St. Brigid's Well near Cliffs of Moher. **Gal. SE.**—Gort.

***S. Ebulus** L. Dwarf Elder; Danewort.—Divisions all *except Gal. W.* A thoroughly established alien.

Viburnum Opulus L. Guelder Rose.—Divisions all. Frequent.

Lonicera Periclymenum L. Woodbine; Honeysuckle. Ꝼeaṫlóᵹ.—Divisions all. Common. To 1550 feet in W. Mayo.

RUBIACEÆ.

Rubia peregrina L. Wild Madder.—Locally abundant, but absent from the north. A very characteristic plant of the limestone pavements, but not altogether confined thereto. **Lim.**—Askeaton; Ringmoylan; Foynes. **Clare**—Fergus islands; abundant in the centre, Burren, and Aran. **Gal. SE.**—south-west, local. **Gal. W.**—frequent on E. margin; Little Killery. **Gal. NE.**—Terryland River; Menlo; Coolaran. **Mayo E.**—S. side of L. Mask; L. Carra. **Mayo W.**—Mweelrea.

Galium boreale L. Northern Bedstraw.—Divisions all. Frequent, but local. Entirely lowland. Abundant on the limestone shores of Loughs Derg, Ree, Corrib, Mask, Carra, Conn, Cullin, and Lower L. Erne. Rarer by Loughs Cooter, Ross, Gara, Beltra, Melvin, Bofin. Locally frequent also on limestone pavements in Lim., Clare, and Gal.

†**G. Cruciata** Scop. Crosswort.—**Ferm.**—plentiful in boggy ground by side of small lake at Colebrooke, 1869; no more recent record. A plant of doubtful standing in Ireland;

Downpatrick and Belfast are its only other stations in the country.

G. verum L. Lady's Bedstraw.—Divisions all. Common.

‡**G. erectum** Huds. Upright Bedstraw.—Rare, and probably introduced with grass-seed. **Lim.**—near Foynes; Adare Manor. **Clare** — Inishmore. **Ferm.** — Enniskillen Model School, established 30 or 40 years.

‡**G. Mollugo** L. Great Hedge Bedstraw.—Very rare in W. Ireland and probably introduced. **Lim.**—near Foynes; Adare Manor. **Clare**—Ballyvaughan.

var. **insubricum** (Gaud.).—**Lim.**—near Ardagh.

G. saxatile L. Heath Bedstraw.—Divisions all. Abundant. Calcifuge. Ascends to the highest summits.

G. sylvestre Poll. *G. asperum* Schreb. Least Mountain Bedstraw.—Local. In Ireland almost confined to limestone pavements and cliffs, in the west. In the former habitat it stretches through Clare and Galway, from the Fergus estuary over Burren and the three Aran Islands, and locally round the head of Galway Bay up each side of L. Corrib as far north as Tuam. Its cliff stations are on the Ben Bulben range, where it occurs sparingly on Ben Bulben and in Gleniff in Sligo, and in Glenade in Leit. To 1000 feet in Clare, and 1200 feet in Sligo, but usually lowland.

G. palustre L. Marsh Bedstraw.—Divisions all. Common. To 1205 feet on Mweelrea. Var. *Witheringii* (Sm.) is the prevailing Irish form.

G. uliginosum L. Rough Marsh Bedstraw.—A Central Plain plant, rare in the west. **Clare**—Ballycar L. **Gal. SE.**—by Woodford River; Portumna. **Gal. NE.**—Dunmore. **Rosc.**—L. Ree between Ballybay and Curry Point.

G. Aparine L. Goosegrass; Cleavers.—Divisions all. Abundant.

Asperula odorata L. Woodruff.—Divisions all. Frequent.

A. cynanchica L. Squinancy-wort.—Limestone rocks and limy sands and clays near the sea. **Lim.**—Foynes. **Clare**—abundant in centre and N., including Aran; rare in SW. on sand-dunes; ascends to 1000 feet. **Gal. SE.**—very common in W. **Gal. W.**—very common on E. margin; sands at Roundstone and westward. **Gal. NE.**—common on coast and up L. Corrib; inland as far as Athenry.

Sherardia arvensis L. Field Madder.—Divisions all. Common.

VALERIANEÆ.

Valeriana officinalis L. Wild Valerian.—Divisions all. Common in the variety *V. sambucifolia* Mikan, ascending to 1960 feet in Mayo.

var. **Mikanii** (Syme).—Very rare. **Clare**—Inchicronan L.; Cappanawallia Mtn. **Gal. SE.**—L. Cooter. **Sligo**—L. Key.

§**Kentranthus** (*Centranthus*) **ruber** DC. Red Valerian.—**Lim.**—garden escape at Cahirmoyle.

Valerianella olitoria Poll. Corn-Salad; Lamb's Lettuce.—Sandy ground and limestone rocks. Local. **Lim.**—Askeaton; L. Gur. **Clare**—Coney I. in R. Fergus; Kilfenora; Inishmore. **Gal. W.**—Inveran. **Gal. NE.**—Claregalway. **Rosc.**—near Athlone.

‡**V. Auricula** DC. *V. rimosa* Bast. Sharp-fruited Corn-Salad.—Colonist in cultivated ground. Rare. **Gal. SE.**—Castle Taylor. **Gal. W.**—Oughterard. **Mayo E.**—Foxford.

‡**V. dentata** Pollich. Narrow-fruited Corn-Salad.—Like the last, but more frequent. Divisions all *except Mayo E. and W., Sligo, Leit.*

DIPSACEÆ.

Dipsacus sylvestris Huds. Teasel.—Rare, decreasing northward. **Lim.**—common on limestone in N. **Clare**—Meelick; Kilrush; Fergus islands; Doonbeg. **Gal. NE.**—Rosshill. **Ferm.**—Lisgoole.

Scabiosa Succisa L. Devil's-bit.—Divisions all. Abundant. To 2000 feet in Galway; 1750 feet on Ben Bulben range.

S. arvensis L. *Knautia arvensis* Coulter. Field Scabious.—Divisions all. Not very common.

COMPOSITÆ.

Eupatorium cannabinum L. Hemp Agrimony.—River-sides, sea-cliffs, &c. Divisions all. Frequent.

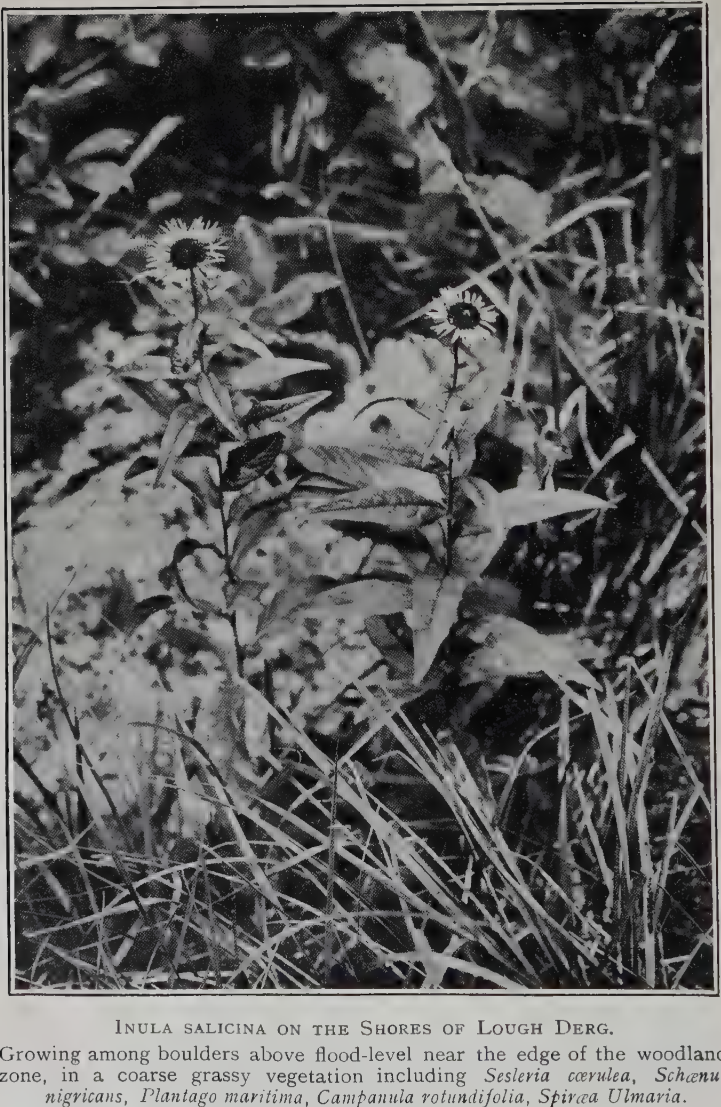
Solidago Virgaurea L. Golden Rod.—Divisions all. Frequent. To 2600 feet in Mayo; 2100 feet on Ben Bulben range.

var. **cambrica** (Huds.).—Apparently frequent in mountain districts, but has not always been distinguished.

Bellis perennis L. Daisy. Noinín.—Divisions all. Abundant. To 1950 feet in Ben Bulben district.

Aster Tripolium L. Sea Starwort.—Common round the coast.

* **A. lævis** L.?—**Leit.**—abundant round Rinn L.



INULA SALICINA ON THE SHORES OF LOUGH DERG.

Growing among boulders above flood-level near the edge of the woodland zone, in a coarse grassy vegetation including *Sesleria cærulea*, *Schœnus nigricans*, *Plantago maritima*, *Campanula rotundifolia*, *Spiræa Ulmaria*.

R. Welch, photo. July, 1908. *To face p.* 155.

Erigeron acre L. BLUE FLEABANE.—Dry places. Rare. **Clare**—Ballyvaughan. **Gal. SE.**—Castle Taylor. **Gal. W.**—Golden Bay on L. Corrib. **Mayo E.**—between Cong cross and Kilmaine.

Filago germanica L. COMMON CUDWEED.—Local. **Clare**—Killadysert; Ballyvaughan; Inisheer. **Gal. SE.**—L. Cooter. **Gal. W.**—local, frequent. **Mayo E.**—frequent. **Mayo W.**—Pontoon; Clare I.

F. minima Fries. LEAST CUDWEED.—A calcifuge plant, extremely rare in western Ireland. **Gal. W.**—Oughterard; plentiful by L. Mask at Maamtrasna. **Mayo W.**—NW. end of L. Mask.

Antennaria dioica Gaertn. *Gnaphalium dioicum* L. MOUNTAIN CUDWEED.—Rather local. Often very abundant in limestone pastures. Divisions all. To 2400 feet in W. Mayo.

Gnaphalium uliginosum L. MARSH CUDWEED.—Divisions all. Frequent except on limestone.

G. sylvaticum L. UPRIGHT CUDWEED.—Strongly calcifuge like the last. Divisions all *except Lim. and Rosc.*, but frequent only in W. Gal. and W. Mayo.

***Inula Helenium** L. ELECAMPANE.—A relic of ancient cultivation, and often found near early ecclesiastical settlements Divisions all *except Rosc., Leit.*

I. salicina L. WILLOW-LEAVED INULA.—In the British Islands confined to the shores of L. Derg, although in Europe it has a very wide range. On L. Derg it has been noted in many spots on the shores and islands, from the head of the lough at Portumna as far south as the vicinity of the Carrikeen Islands near Dromineer. Not yet recorded from that portion of the lake which lies in Clare.

Its habitat is the coarse grassy boulder-strewn zone that intervenes between flood-level and the arboreal zone (plates 9, 19). There it runs about, forming small colonies, and flowering rather sparingly in July. In the garden it spreads rapidly, and soon forms a large patch, with a network of slender white underground stems.

First found by Dr. David Moore in 1843.[1]

Pulicaria dysenterica Gray. *Inula dysenterica* L. FLEABANE.—Divisions all. Frequent.

Bidens cernua L. NODDING BUR-MARIGOLD.—Divisions all. Frequent.

B. tripartita L. TRIFID BUR-MARIGOLD.—Divisions all. Frequent, but local.

---

[1] D. MOORE, *Journ. Bot.*, iii. 333–5, 1865, and iv. 33–6, tab. 43, 1866.

Achillæa Millefolium L. YARROW; MILFOIL. Aċair talṁan (? naċair talṁan, Adder).—Divisions all. Common. To 2550 feet in W. Mayo.

A. Ptarmica L. SNEEZEWORT.—Divisions all. A weed of cultivated land in non-limestone districts. On the limestone almost restricted to and abundant on lake-shores and land liable to inundation.

‡**Anthemis Cotula** L. STINKING CHAMOMILE.—A colonist, rare in the north. Divisions all *except Leit.*, but frequent in NE. Gal. alone. Like so many weeds of light soils, absent from the great western buttress formed by W. Gal. and W. Mayo, except on the limestone on the eastern border.

A. nobilis L. CHAMOMILE.—Heathy places, and roadsides in hilly districts. Calcifuge. **Lim.**—*Market-place. **Gal. W.** and **Mayo W.**—frequent. **Mayo E.**—Ballymore L.; Narrow Lake on L. Mask.

§**A. arvensis** L. CORN CHAMOMILE.—**Lim.**—casual at Limerick.

Chrysanthemum segetum L. CORN MARIGOLD; GILGOWAN.—Divisions all. Calcifuge.

C. Leucanthemum L. OX-EYE; DOG-DAISY. Nóinín ṁór (Great Daisy).—Divisions all. Common.

§**C. Parthenium** Bernh. *Matricaria Parthenium* L. COMMON FEVERFEW.—Occasionally run wild from gardens. Seems quite naturalized on Inistoney in Lower L. Erne.

Matricaria inodora L. SCENTLESS FEVERFEW.—Divisions all. Common, especially near the sea.

var. **salina** Bab.—**Clare**—Murrough. **Gal. W.**—Salthill; Roundstone.

***M. Chamomilla** L. FIELD CHAMOMILE.—**Lim.**—Limerick. **Clare**—roadside near Cratloe; abundant about Newmarket and Rineanna Point. **Mayo W.**—Westport; Newport.

***M. discoidea** DC. *M. suaveolens* Buchenau. RAYLESS FEVERFEW.—Roadsides, railways, and waste places. Divisions all. Frequent. A North American immigrant, first observed in Ireland in 1894 in Co. Dublin,[1] but having its head-quarters in the centre and west. From the western ports it has spread to the islands, and is the first plant one sees on landing on Inishturk or Clare I. It now swarms about many of the western towns.

***M. occidentalis** Greene.—This subspecies, distinguished from *M. discoidea* by its fruit crowned with two coriaceous teeth, and its more vigorous and upright habit, is much rarer than its ally. **Lim.**—waste ground at Limerick. **Sligo**—roadsides at Ballysadare.

---

[1] N. COLGAN, *Irish Nat.*, iii., 215–6. 1894.

***Tanacetum vulgare** L. Tansy.—An escape from gardens. Divisions all *except Gal. SE.*

‡**Artemisia Absinthium** L. Wormwood.—Established about villages. **Clare** — Inishmore. **Gal. SE.**—frequent in W. **Gal. W.**—Kilbeg ferry. **Gal. NE.**—Oranmore; Ballindooly; Claregalway; Kilbeg ferry.

A. vulgaris L. Mugwort.—Divisions all. Frequent.

var. **coarctata** Forcell.—**Gal. W.** and **Mayo E.**—about Clonbur.

A. maritima L. Sea Wormwood.—Occurs in two large patches on the west coast—one in the Shannon estuary, and one in Galway Bay. **Lim.**—abundant above Foynes. **Clare**—abundant in Fergus estuary; Gleninagh near Ballyvaughan. **Gal. SE.**—Carranroe; abundant from Kinvarra to Parkmore. **Gal. W.**—Barna.

Tussilago Farfara L. Coltsfoot.—Divisions all. Common. To 1700 feet on Ben Bulben range.

***Petasites fragrans** Presl. Winter Heliotrope.—A shrubbery escape, now recorded from all divisions, though still rare in many.

P. officinalis Mœnch. *P. vulgaris* Desf. *P. ovatus* Hill. Butterbur. Puból.—Divisions all, but very irregularly distributed.

Senecio vulgaris L. Groundsel.—Divisions all. Common.

var. **radiatus** Koch.—**Lim.**—Kilmallock. **Clare**—Kilrush, one plant.

S. sylvaticus L. Heath Groundsel.—Divisions all. A calcifuge plant, but in the limestone areas it finds a congenial home on dry bog-banks, &c.

S. Jacobæa L. Ragwort. buaċalán buiḋe (Yellow Boy).—Divisions all. Abundant. To 1630 feet on Croaghpatrick.

var. **flosculosus** (Jord.).—**Clare**—frequent in Aran. **Gal. W.**—Knocknagoneen; Roundstone; on several Connemara islands. **Mayo W.**—Old Dugort and Valley on Achill; abundant on the Mullet. **Sligo**—Strandhill sand-dunes.

S. aquaticus Hill. Marsh Ragwort. Saṁ-a-curraiġe (Sun of the Marsh?).—Divisions all. Common. To 1205 feet on Mweelrea. Replaces *S. Jacobæa* in pastures in rainy western districts.

var. **pennatifidus** Gren. and Godr.—**Gal. W.**—Maam; Clonbur. **Mayo E.**—Cong.

***S. saracenicus** L.—An outcast of gardens, very rare in the west, the only reliable station being Cahiracon in Clare.

Carlina vulgaris L. Carline Thistle.—Chiefly on limy soils and limy sands. Decreases northwards. **Lim.**—abundant about Mullough and Askeaton; Foynes. **Clare**—throughout the limestone area, from the Fergus islands to Aran. **Gal. SE.**—abundant. **Gal. W.**—plentiful along E. margin; Roundstone; Bunowen. **Gal. NE.**—abundant. **Rosc.** and **Mayo E.**—abundant in S. **Mayo W.**—L. Conn; W. of Castlebar; on the Silurian island of Inishturk.

Arctium majus Bernh. Great Burdock.—**Rosc.**—Ballinasloe. Distribution not worked out.

A. intermedium Lange.—Divisions all. Frequent. Mr. Beeby considers this to be *A. majus* × *minus*.

A. minus Bernh. Lesser Burdock.—Divisions all *except Gal. NE.* Frequent.

A. Newbouldii Ar. Benn.—**Mayo W.**—Clare I.; Cross Lough on Mullet. Range not known.

Carduus pycnocephalus L. *C. tenuiflorus* Curtis. Slender-flowered Thistle.—Chiefly near the sea. Divisions all *except Leit. and Ferm.*, but rather rare and local. Doubtfully native in Mayo E. and W.

C. nutans L. Musk Thistle.—Rare, and apparently uncertain in its appearances. **Clare**—Corcomroe; Muckinish; Inishmore; Inishmaan. **Gal. SE.**—Oranmore; Castle Taylor; Kiltartan. **Mayo W.**—Clare I.

C. crispus L. Welted Thistle.—Roadsides, &c. Rare in the west. **Lim.**—Limerick; Grange. **Clare**—near Corofin. **Gal. SE.**—Castle Taylor. The usual Irish form is *C. acanthoides* L.

Cnicus lanceolatus Willd. Spear Thistle. Foċannán; Feoċadán.—Divisions all. Common.

C. palustris Willd. Marsh Thistle.—Divisions all. Common. An abundant pasture plant in the west. To 1600 feet on Ben Bulben range.

C. palustris × pratensis.—**Clare**—Lisdoonvarna. **Mayo E.**—NW. of Claremorris; Shangorman I. in L. Mask.

C. pratensis Willd. Bog Thistle.—Divisions all. Frequent. Very abundant in many of the extreme western places. To 1950 feet on Ben Bulben range.

C. arvensis Hoffm. Field Thistle.—Divisions all. Abundant. To 1600 feet on Ben Bulben range.

var. **setosus** Bess.—**Mayo W.**—Gortnaraby on L. Conn.

*__Silybum Marianum__ Gærtn. *Carduus Marianus* L. Milk Thistle.—Garden escape, occasionally established. **Lim.**—Askeaton; Foynes; Shanid Castle. **Clare**—Feenish; Muckinish; Inishmore. **Gal. W.**—beach near Galway.

Saussurea alpina DC. Mountain Saw-wort.—Rare, on alpine cliffs. **Gal. W.**—Ben Lettery; Muckanaght; 1320–

1700 feet. **Mayo W.**—Sheffry; Croaghpatrick; Croaghmore on Clare I.

Centaurea nigra L. Black Knapweed.—Divisions all. Common.

C. Scabiosa L. Great Knapweed.—Rather southern and calcicole in its range. Frequent in the limestone districts of Lim., Clare, and Gal., and in the SW. part of E. Mayo. Rare on sea-sands, as in SW. Connemara and on Inishbofin. In Rosc. at Moore and near Ballinasloe only. Sometimes far from limestone rocks, as at Spiddle and Glen Inagh in W. Gal.

***C. Cyanus** L. Corn Bluebottle.—Cultivated land. Very rare. **Lim.**—near Foynes. **Clare**—Gleninagh near Ballyvaughan. **Leit.**—Glenade. **Ferm.**—Rossclare; Gubbaroe Point; Tamlaght.

§**C. Calcitrapa** L. Star Thistle.—**Lim.**—casual at Limerick.

§**C. solstitialis** L. St. Barnaby's Thistle.—**Lim.**—waste ground, Limerick. **Clare**—ballast at Kilrush.

***Cichorium Intybus** L. Chicory.—Little more than a casual. Recorded from Lim., Clare, Gal. SE. and W., Mayo E. and W., Sligo.

Lapsana communis L. Nipplewort.—Divisions all. Common.

†**Picris echioides** L. Bristly Ox-tongue.—**Clare**—Bunratty.

†**Crepis taraxacifolia** Thuill. Dandelion Hawksbeard.—Chiefly about towns. Rather rare, but spreading. **Lim.**—Mungret. **Clare**—Ballyvaughan. **Gal. SE.**—Ballinasloe. **Gal. W.**—Ashford bridge. **Rosc.**—common about Athlone; Kiltoom. **Mayo E.**—Lisloughry. **Ferm.**—Belleek.

C. virens L. *C. capillaris* Wallr. Smooth Hawksbeard.—Divisions all. Common.

***C. biennis** L. Rough Hawksbeard.—An introduction with grass-seed, naturalized and spreading. **Lim.**—Adare; Ferrybridge; Friarstown; Foynes; near Tarbert. **Clare**—Finlough. **Gal. NE.**—Cregmore bridge NW. of Athenry. **Sligo**—casual at L. Gill.

C. paludosa Mœnch. Marsh Hawksbeard.—Divisions all *except Gal. NE.* Frequent, especially in hilly districts, and increasing northward. To 1700 feet on Ben Bulben and Nephinbeg ranges.

Hieracium Pilosella L. Mouse-ear Hawkweed.—Divisions all. Common. To 1300 feet on Ben Bulben range.

§**H. aurantiacum** L. Orange Hawkweed.—**Gal. NE.**—Moat Lodge, Menlough. An escape.

H. anglicum Fr.—**Clare**—frequent in Burren down to sea-level; Inishmore. **Gal. W.**—frequent on mountains. **Mayo**

W.—frequent on mountains; sea-cliffs on Clare I. **Sligo**—Knockachree; Keshcorran; frequent on Ben Bulben range. **Leit.**—L. Gill; frequent on Ben Bulben range. **Ferm.**—frequent in SW.

var. **acutifolium** Backh.—**Sligo**—cliffs of Glenade.

var. **cerinthiforme** Backh.—**Sligo**—N. of W. end of Glencar L.; Ben Whiskin. **Leit.**—Glencar.

var. **longibracteatum** F. J. Hanb.—**Sligo**—Keshcorran.

H. iricum Fr.—**Clare**—frequent in N., down to 100 feet.—**Gal. SE.**—S. of Kinvarra; Garryland; Castle Taylor. **Gal. W.**—frequent. **Gal. NE.**—abundant on esker 4 miles N. of Tuam. **Mayo E.**—W. side of L. Carra. **Mayo W.**—Rosserk Abbey; E. side of L. Conn; Doo Lough. **Sligo**—Knockachree; Ben Bulben. **Leit.**—Glenade; L. Gill; Faughrey Mtn. Ascends to 1350 feet.

H. lasiophyllum Koch. *H. cinerascens* Jord.—**Gal. W.**—by L. Corrib near Bleanoran. **Gal. NE.**—limestone rocks at Menlo. **Ferm.**—Knockmore; Carrick; Badmore.

H. argenteum Fries.—**Gal. W.**—Muckanaght; Maumeen; 1110–1520 feet.[1]

H. murorum L.—**Clare**—Ballyvaughan. **Sligo**—Ben Bulben; Goat I. in L. Gill.

H. stenolepis Lindeb.—**Sligo**—Carrowkeel Mtn. **Leit.**—shore of L. Gill.

H. ciliatum Almq., var. **repandum** Ley.—**Sligo**—Ben Bulben.[1]

H. serratifrons Almq., var. **lepistoides** Johanss.—**Lim.**—abundant on walls at Adare Manor.

H. crebridens Dahlst.—**Clare**—Ballyvaughan.

H. hypochæroides Gibs. *H. Gibsoni* Backh.—**Clare**—Eagle Rock on Slieve Carran. **Sligo**—Ben Bulben.[1]

var. **saxorum** F.J.H.—**Mayo W.**—cliffs near the lighthouse on Clare I.

H. cæsium Fries.—**Clare**—E. of Ballyvaughan.

H. vulgatum Fries.—**Gal. W.**—Galway city; Muckanaght. **Gal. NE.**—walls at Galway. **Mayo W.**—SW. shore of L. Conn.

H. orarium Lindeb., var. **fulvum** F.J.H.—**Mayo W.**—by L. Conn S. of Derreen.

H. gothicum Fries.—**Gal. W.**—"Connemara."

H. tridentatum Fries.—**Ferm.**—Marble Arch. The only Irish station.

H. crocatum Fries.—**Gal. W.**—Ballynahinch.

---

[1] R. Ll. Praeger: On some Irish Hawkweed and Pondweed Records. *Irish Nat.*, xviii., 81–85. 1909.

H. umbellatum L.—**Clare** and **Gal. SE.**—abundant on many promontories and islets of L. Derg. **Gal. W.**—L. Inagh and Glen Inagh River; Maam; L. Corrib. **Mayo W.**—L. Conn; L. Cullin; Annagh L. on Achill I. **Ferm.**—Namanfin I. in Lower L. Erne.

Hypochæris radicata L. Long-rooted Cat's-ear.—Divisions all. Common. To 1850 feet on Ben Bulben range.

Leontodon hirtum L. *L. nudicaule* Banks and Soland. *Thrincia hirta* DC. Hairy Hawkbit.—Divisions all, decreasing northward. Unequally distributed.

L. hispidum L. *Apargia hispida* Willd. Rough Hawkbit.—Local, and absent from the north. Calcicole. **Lim.**—Mullough; Thornfields. **Clare**—sandhills at Lehinch. **Gal. SE.**—Moyode; Portumna. **Gal. W.**—NE. of Ross L.; Moycullen; Galway. **Gal. NE.**—N. of Tuam; Knockmae. **Rosc.**—occasionally throughout. **Mayo E.**—Manulla; Cong; Hollymount; L. Carra.

L. autumnale L. Autumnal Hawkbit.—Divisions all. Common. To 2500 feet in Mayo.

var. **simplex** Duby.—**Mayo W.**—sea-rocks on Inishkea; sea-rocks and at 1500 feet on cliffs of Croaghaun, Achill; a tiny unbranched plant.

var. **pratense** (Koch).—**Mayo W.**—above L. Brawn on Mweelrea. **Sligo**—Ben Bulben.

Taraxacum officinale Web. Dandelion. Cáıꞅ τꞅeaꞃḃán (Bitter-root).—Divisions all. Abundant. To 2100 feet in Mayo; 1700 feet on Ben Bulben range.

var. **palustre** (DC.).—Recorded from Lim., Clare, Gal. W., Mayo E., Sligo, Leit.

var. **udum** (Jord.).—Recorded from Gal. W., Mayo E. and W.

§**Lactuca virosa** L. Strong-scented Lettuce.—**Lim.**—holding its own on waste ground at Limerick.

Sonchus oleraceus L. Sowthistle.—Divisions all. Common.

S. asper Hill. Rough Sowthistle.—Divisions all. Common. To 900 feet in Ben Bulben district.

S. arvensis L. Corn Sowthistle.—Divisions all. Locally common.

var. **angustifolia** Mey.—**Mayo E.**—SE. end of L. Mask.

Tragopogon pratense L. Goat's-beard.—Light soils on limestone. **Lim.**—frequent in N. **Clare**—Parteen. **Gal. SE.**—L. Cooter; Craughwell; Garryland. **Gal. W.**—near Galway. **Gal. NE.**—near Ahascragh. **Rosc.**—west of Athlone. **Mayo E.**—Hollymount. **Mayo W.**—Westport; W. of Castlebar.

var. **minus** (Mill). Perhaps common, but on record only from Lim. and SE. Gal.

*__T. porrifolium__ L. Salsify.—**Lim.**—established about Foynes.

§**Ambrosia artemisiæfolia** L.—**Lim.**—casual at Limerick.

CAMPANULACEÆ.

Lobelia Dortmanna L. Water Lobelia.—Lakes from sea-level to 1200 feet. **Clare**—L. Effernan and Gortglass L. near Killadysert; Monmor bog. **Gal. SE.**—Esker L. near Kinvarra. **Gal. W.**—widespread and frequent. **Gal. NE.**—wet bog near Killower L. **Mayo E.**—Ballymore L.; L. Corrib; L. Mask. **Mayo W.**—frequent, extending to Inishturk. **Sligo**—several lakes in Ox Mtns. **Ferm.**—L. Navar.

Jasione montana L. Sheep's Scabious.—Calcifuge. Frequent off the limestone. Divisions all *except Gal. SE. and NE., Rosc., Leit., Ferm.* To 2200 feet on Achill.

var. **major** Koch.—**Gal. W.**—Mount Gable.

*__Campanula rapunculoides__ L. Creeping Bell-flower.—Established in pasture near Westport Quay, W. Mayo.

C. rotundifolia L. Hare-bell. Méaraċán gorm (Blue Thimble).—Local. Divisions all *except Lim.* Rare in inland districts. To 2600 feet on Mweelrea.

var. **speciosa** More.—**Gal. W.**—S. of the harbour on Inishbofin. **Sligo**—near Collooney (var. *arctica* Lange). A very large-flowered form, unknown elsewhere.

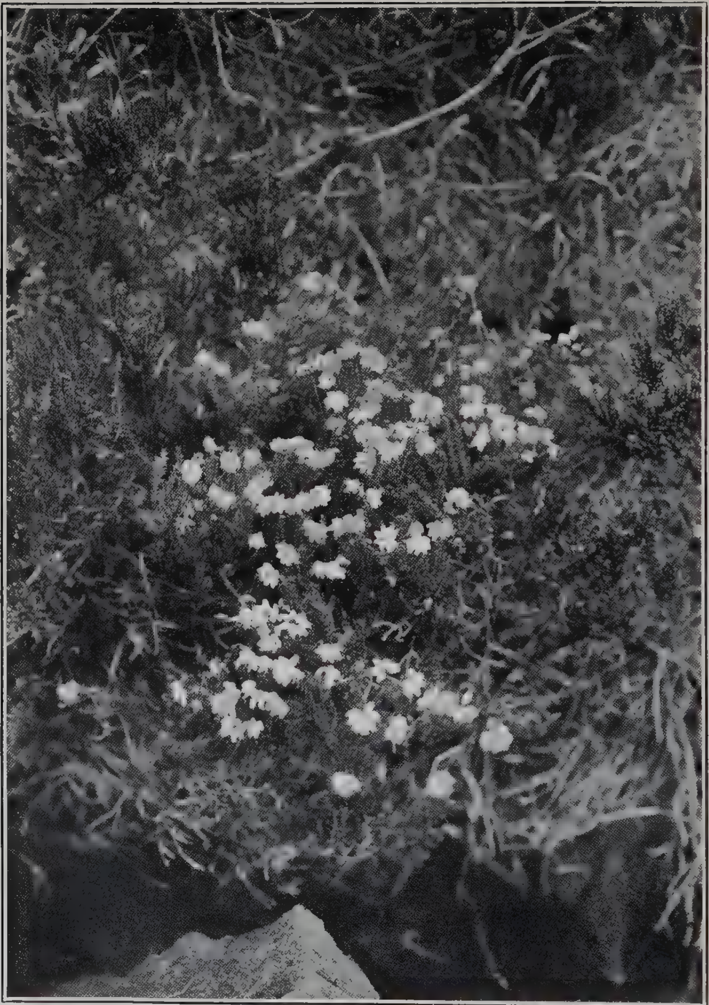
var. **lancifolia** Mert. and Koch and var. **hirta** Mert. and Koch.—South of Lough Mask—both in Mayo E., the latter also in Gal. W.

VACCINIEÆ.

Vaccinium Vitis-Idæa L. Cowberry. Braiġleoġ.—Mountains in the N. **Mayo W.**—Nephin; Corslieve; Mweelrea; Slievemore on Achill; ascends to 2400 feet. **Sligo**—Ben Bulben; Truskmore; frequent on Ox Mtns. **Ferm.**—common on hills in SW.; in Correl Glen, 300–400 feet elevation, it grows luxuriantly on mossy tree-stems and rock-surfaces.

V. Myrtillus L. Bilberry; Whortleberry. Fraoċán.—Divisions all. Common. Calcifuge. Ascends to the highest summits.

V. Oxycoccos L. *Schollera Occycoccus* Roth. *Oxycoccus quadripetala* Gilib. Cranberry.—Divisions all *except Gal. W.* Chiefly in low-level bogs in inland districts.



ERICA MACKAII ON THE EDGE OF CRAIGGA MORE LOUGH, CONNEMARA.
The accompanying plants include *E. cinerea*, *Calluna vulgaris*, *Dabeocia polifolia*, *Myrica Gale*, *Molinia cærulea*, *Osmunda regalis*. July, 1908.

R. Welch, Photo. *To face p.* 163.

ERICACEÆ.

Arctostaphylos Uva-ursi Spreng. Bear-berry. — Locally abundant, both on and off the limestone. **Clare**—near Cratloe; very abundant in Burren, from sea-level upwards. **Gal. SE.**—L. Fingall; Castle Taylor. **Gal. W.**—frequent, ascending to 1800 feet. **Gal. NE.**—frequent in district N. of Athenry. **Mayo W.**—frequent.

Andromeda Polifolia L. Marsh Andromeda.—Divisions all *except Gal. W., Mayo W., Ferm.* The home of this plant is in the low-level bogs, especially in the Central Plain. The extensive low bog-lands of W. Gal. and W. Mayo are in some way different as regards conditions, as shown by the absence there of this plant and the rarity of its ally, *Vaccinium Oxycoccos.*

Calluna vulgaris Hull. Ling. Fraoċ.—Divisions all. Common. Ascends to the highest summits.

Erica Tetralix L. Cross-leaved Heath; Bell-Heather.—Divisions all. Common. To 1700 feet on Ben Bulben range, and 1290 feet on Nephin.

E. Mackaii Hooker. Mackay's Heath.—Restricted in the British Isles to a few stations near Roundstone in W. Gal.; and elsewhere to the mountains of Castile and Asturia. **Gal. W.**—in good quantity about Craigga More hill and lough, extending for nearly a mile east and west; close by hamlet of Letterdife, N. of Roundstone; on Urrisbeg at 600 feet; east of Carna police-barrack.

Has a rather straggling habit, recalling that of *E. Tetralix*, among which it grows, and from which it is at once picked out by the broader ciliate leaves, and the flowers rose-coloured on the sunny side, almost white on the other. On the margin of Craigga More Lough its blossoms may be seen mixing with those of Dabeocia, with Eriocaulon and Lobelia rising out of the water to meet them, forming a charming and unique picture. A double-flowered form found at Craigga More by Mr. F. C. Crawford of Edinburgh in 1891, has been called by nurserymen *E. Crawfordii.*

This plant flowers all summer and autumn. First found by William M‘Alla a little before 1835.

E. cinerea L. Heather. Fraoċ.—Divisions all. Locally abundant. Generally in peaty soil or on non-calcareous rocks, but flourishes on bare limestone "crags" at Coolavin, NE. Gal., and L. Carra, E. Mayo; on esker-ridges of limestone gravel at Ross Lake, W. Gal.; and on the Aran Islands.

To 1600 feet on Ben Bulben range, and 2250 feet on Mweelrea group.

E. mediterranea L. *E. hibernica* Syme. *E. mediterranea* var. *hibernica* Hooker. MEDITERRANEAN HEATH.—Very local. **Gal. W.**—W. slope of Urrisbeg near Roundstone; about Kylemore, Killery, and Salruck. **Mayo W.**—Mweelrea; N. side of Clew Bay at intervals from Newport to near Saddle Head on Achill, being particularly abundant and luxuriant (over 6 feet high) at Mallaranny (see plate 13); thence northward to Carrowmore L., very abundant locally; occasionally on N. half of the Mullet; on either side of the middle portion of L. Conn.

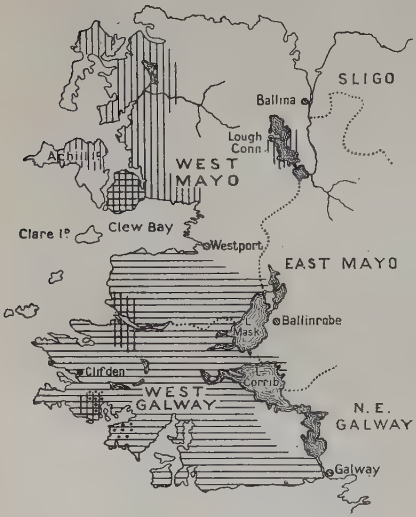


FIG. 14.—Distribution of Dabeocia polifolia (horizontal lines), Erica mediterranea (vertical lines), and E. Mackaii (dots).

A plant of wet boggy ground, generally sloping, but of no great elevation. Particularly fond of the edges of streamlets and lakes. Usually forms scrubby rounded bushes about 2 feet in height, easily picked out from among the other heaths by their erect twigs and spreading leaves. Often commences to flower in January. At its best in April; and frequently flowers sparingly in autumn. In Erris and Achill a dark-flowered dwarf form occurs; but when grown in the garden alongside the typical plant for a few years, very little difference is perceptible. First found by J. T. Mackay in 1830 on Urrisbeg.[1] Unknown in Ireland outside the stations quoted. Not in Great Britain. Elsewhere confined to Portugal, NW. Spain, and SW. France.

E. mediterranea × **Mackaii**. *E. Stuarti* Linton.—**Gal. W.**—growing with *E. Mackaii* at Craigga More, where it was found sparingly by Mr. Charles Stuart of Chirnside, Edinburgh, in 1890.[2] First considered as a variety of *E. Tetralix*, it has been recently described[3] as a hybrid between the two local heaths named above. The single clump which was found grew with the second of the parents, the nearest habitat of the other lying 2½ miles to the southward.

Dabeocia polifolia D. Don. *D. cantabrica* Rendle and Britten. *Menziesia polifolia* Juss. St. Dabeoc's Heath. Fraoċ na haoinċoise (One-footed Heath); Fraoċ gallda (Foreign Heath).—Confined in Ireland to W. Gal. and Mayo, elsewhere to the Spanish peninsula and the Azores. **Gal. W.**—widely distributed and generally frequent, from the extreme W. to the edge of the limestone. **Mayo E.**—from Cong SE. to beyond Ballymacgibbon Bay; W. of Partry village; Shangorman or Martyn's I. on E. side of L. Mask. **Mayo W.**—locally frequent from Killery to Clew Bay; Curraun Achill. To 1900 feet on Maamtrasna, and 1800 feet on Twelve Bens. Commences flowering in May, and blooms throughout the summer and autumn. A rather straggling plant, growing best when trailing through other shrubby species, such as Heather, Brambles, or *Ulex Gallii*. See plate 10.

Pyrola media Sw. Intermediate Winter-green.—Heaths. **Clare**—frequent in Burren to 1075 feet. **Mayo W.**—Treenlaur near Westport. **Sligo**—Ben Whiskin; Hazelwood. **Ferm.**—frequent on sandstone scarps on the hills SW. of Lower L. Erne.

P. minor L. Lesser Winter-green.—Woods and heaths. **Leit.**—wood near Lurganboy. **Ferm.**—Carricknagower L.

P. secunda L. Serrated Winter-green.—**Ferm.**—frequent on sandstone scarps on the hills SW. of Lower L. Erne, from 400 feet in Correl Glen to over 1100 feet on Shean

---

[1] J. T. Mackay: Notice of a New Indigenous Heath, found in Cunnamara. Trans. R. Irish Acad., xvi., 127-8. 1830.

[2] J. M. MacFarlane, Trans. and Proc. Bot. Soc. Edinb., xix. 58-64, plate 1. 1891.

[3] E. F. Linton, *Ann. Scott. Nat. Hist.*, xi., 176-7, 1902; and *Irish Nat.*, xi., 177-8, 1902.

North. Elsewhere in Ireland found only in Antrim and Derry, where it has not been seen recently.

Hypopithys multiflora Scop. *Monotropa Hypopitys* L.—Yellow Bird's-nest.—Woods. Very rare. **Lim.**—Curragh Chase. **Gal. SE.**—Castle Taylor; Garbally Court. **Rosc.**—in some quantity in Carrowroe Park. **Sligo**—Dooney Rock on L. Gill; Hazelwood. **Ferm.**—Ely Lodge.

PLUMBAGINEÆ.

Statice rariflora Drej. *Limonium humile* Mill. Loose-flowered Sea-lavender.—Frequent on muddy coasts, but local. **Lim.**—Foynes; Ringmoylan. **Clare**—abundant in Fergus estuary; near Ballyvaughan. **Gal. SE.**—chiefly in Kilcolgan estuary. **Gal. W.**—Gentian Hill; Barna; Ballyconneely; Clifden. **Mayo W.**—Killala Bay; Westport portion of Clew Bay.

S. occidentalis Lloyd. *Limonium binervosum* C. E. Salmon. Rock Sea-lavender.—Very rare. **Clare**—Loop Head; local in Burren; Inishmore; Inishmaan.

var. **intermedia** Syme.—**Clare**—near Poulsallagh.

Armeria maritima Willd. *Statice maritima* Mill. Sea-Pink; Thrift.—Round the whole coast. Also frequent on the higher mountains of Gal. W. and Mayo W. to 2640 feet.

PRIMULACEÆ.

Primula vulgaris Huds. Primrose. bainn bó bleaċtáin (Milch Cow's Milk).—Divisions all. Common. To 1600 feet on Ben Bulben range; 1900 feet on Mweelrea.

P. vulgaris × veris.—**Gal. W.**—near Salthill. **Rosc.**—Kilteevan.

P. officinalis Jacq. *P. veris* L. Cowslip.—Local and often rare. Nearly confined to the limestone. **Lim.**—north, frequent. **Clare**—Cahir R. **Gal. SE.**—frequent. **Gal W.**—near Galway; Clonbur. **Gal. NE.**—occasional. **Rosc.**—rather rare. **Mayo E.**—Ballinrobe; Clonbur. **Sligo**—"Co. Sligo." **Leit.**—Rinn L. **Ferm.**—rare.

Lysimachia vulgaris L. Yellow Loosestrife.—Divisions all. Frequent. Like some other riverside and lowland species, absent from all but the eastern margin of W. Gal. and W. Mayo (except for a small colony on the Mullet).

***L. Nummularia** L. Moneywort; Creeping Jenny.—Naturalized in damp ground. **Clare**—Dromoland. **Gal. NE.** and **Rosc.**—Mount Talbot. **Leit.**—mouth of Bonet R. **Ferm.**—Local; chiefly about L. Erne.

L. nemorum L. Yellow Pimpernel.—Divisions all. Common. To 1850 feet on Mweelrea.

Glaux maritima L. Sea Milkwort; Black Saltwort.—Common on the coasts and estuaries. To 400 feet on Clare I.

Anagallis arvensis L. Scarlet Pimpernel.—Divisions all. Frequent.

var. **cærulea** Schreb.—**Gal. W.**—near Belmont.

A. tenella Murr. Bog Pimpernel.—Divisions all. Frequent. A characteristic and abundant plant of the extreme western districts. To 820 feet on Croaghpatrick.

Centunculus minimus L. Bastard Pimpernel.—Rare. Usually off the limestone. **Clare**—Doonbeg; Kilkee to Loop Head. **Gal. W.**—Inishbofin; Clifden; Ballynahinch; Oughterard. **Mayo W.**—Mallaranny; Erris; frequent on the Mullet and Inishturk. **Sligo** — between Cliffony and Mullaghmore. **Ferm.**—Gubbaroe Point on Lower L. Erne.

Samolus Valerandi L. Brookweed.—Divisions all. Frequent.

OLEACEÆ.

Fraxinus excelsior L. Ash. Fuinnseóg. — Divisions all. Frequent. To 907 feet on Ben Bulben range.

†**Ligustrum vulgare** L. Privet.—Frequent as an introduced shrub. The only place where it looks native is on limestone crags at Garryland, SE. Gal., where it grows with native shrubs, but may possibly be bird-sown.

APOCYANEÆ.

§**Vinca major** L. Greater Periwinkle.—A garden plant, occasionally run wild on banks.

§**V. minor** L. Lesser Periwinkle.—Like the last.

GENTIANEÆ.

Chlora perfoliata L. *Blackstonia perfoliata* Huds. Yellowwort.—S. part of the district. Common on the limestone in Lim., Clare, Gal.; rarer in Rosc., E. Mayo; in Sligo at Rosses Point and Carrowmore. On limy sea-sands and clays in W. Gal.

Erythræa Centaureum Pers. *Centaurium umbellatum* Gilib. Centaury. Dréimire Muire (Mary's Ladder).—Divisions all. Frequent.

var. **capitata** Koch.—**Clare**—Lehinch. **Gal. W.**—Roundstone. **Mayo W.**—Mallaranny.

Gentiana verna L. Spring Gentian.—Limestone pastures, esker-ridges, and sandhills. One of the most characteristic plants of the district, with a wide and probably continuous range on the limestone. In Ireland not found elsewhere. **Clare**—abundant in Burren to 1000 feet, and in the three Isles of Aran, and follows the limestone down to Ennis. **Gal. SE.**—locally abundant in W.; esker at Larch Hill, 2 miles N. of Loughrea. **Gal. W.**—Gentian Hill near Galway (a bank of limestone drift); thence to Oughterard; Cong. **Gal. NE.**—frequent in SW., extending E. in places (as at Athenry and Knockmae) up to 10 to 15 miles from L. Corrib. **Mayo E.**—Moore Hall on L. Carra.

Very rare off the limestone, but grows on peaty roadside banks on the shales, 700–800 feet elevation, between Ballyvaughan and Lisdoonvarna. Its occurrence in abundance on sea-sands near Ballyvaughan cannot rank as an exception to its calcicole proclivities.

G. Amarella L. Felwort.—Calcicole. Locally frequent on the limestone, decreasing N. Divisions all *except Leit.*, but on E. margin only of W. Gal. and W. Mayo (excepting a colony on dunes near Belmullet). Absent over large areas.

G. campestris L. Field Gentian.—Divisions all *except Rosc. and Leit.* Widely but thinly distributed, usually with only one or two stations in each division.

Menyanthes trifoliata L. Bog-bean. bearnán laċán (Jagged Duck's Plant?)—Divisions all. Common. To 1400 feet on Ben Bulben range; 1480 feet on Mweelrea.

POLEMONIACEÆ.

§**Gilia capitata** Sims.—**Lim.**—casual at Limerick.

BORAGINEÆ.

‡**Symphytum officinale** L. Comfrey.—Divisions all. A frequent outcast from cultivation.

var. **patens** (Sibth.).—**Gal. SE.**—Portumna.

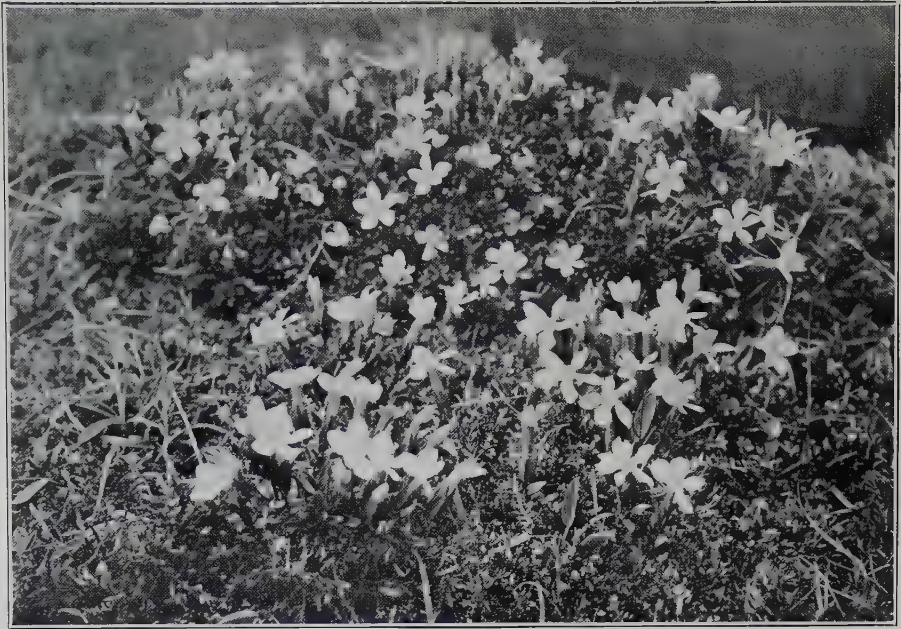
§**Anchusa sempervirens** L. Alkanet.—**Sligo**—Rosses Point. A garden plant run wild.

Lycopsis arvensis L. Field Bugloss.—Very rare in the west, like many other light-soil plants. **Sligo**—Strandhill; Mullaghmore.

§**Borago officinalis** L. Borage.—Casual. **Lim.**—Limerick; Adare. **Mayo E.**—Ballinrobe.

Myosotis cespitosa Schultz.—Tufted Scorpion-grass.—Divisions all. Common.

PLATE 21.



GENTIANA VERNA ON SAND-DUNES AT BALLYVAUGHAN, CO. CLARE.

The flora of the close sward in which the Gentian forms numerous patches includes much *Asperula cynanchica*, *Galium verum*, *Thymus Serpyllum*, with *Euphvasia Salisburgensis* and *Habenaria intacta*. May, 1907.

R. Welch, Photo. *To face p.* 168.

M. palustris Hill. *M. scorpioides* L. FORGET-ME-NOT.—Divisions all. Frequent.

M. repens G. and D. Don. CREEPING SCORPION-GRASS.—Common in hilly districts off the limestone. Divisions all *except Gal. SE. and NE.* To 1370 feet on Croaghpatrick.

M. arvensis Hill. FIELD SCORPION-GRASS.—Divisions all. Common.

M. collina Hoffm. EARLY SCORPION-GRASS.—Very rare, on limestone rocks. **Lim.**—Cahirmoyle. **Gal. NE.**—Knockmae. **Mayo E.**—Ballinrobe.

M. versicolor Sm. PARTI-COLOURED SCORPION-GRASS.—Divisions all. Common.

Lithospermum officinale L. GROMWELL.—Divisions all *except Rosc., Mayo E., Leit., Ferm.* Thinly but widely distributed.

†**L. arvense** L. FIELD GROMWELL.—A rare colonist in tilled land. **Gal. SE.**—Castle Taylor. **Rosc.**—near Athlone; by R. Suck W. of Glenmore.

Echium vulgare L. VIPER'S BUGLOSS.—Very rare, and sometimes doubtfully native. **Lim.**—Rathkeale; railway at Foynes. **Gal. SE.**—sandpit near Craughwell.

CONVOLVULACEÆ.

Calystegia sepium Br. *Convolvulus sepium* L. GREAT BINDWEED.—Divisions all. Common.

C. Soldanella Br. *Convolvulus Soldanella* L. SEA BINDWEED.—Sandy sea-shores. Very rare. **Clare**—Doonbeg; Murrough; three Isles of Aran.

Convolvulus arvensis L. SMALL BINDWEED.—On light soils. Divisions all, but usually rare, and sometimes not native. Occurs on Inishmore and Inishkea.

‡**Cuscuta Trifolii** Bab. CLOVER DODDER.—Established in dry fields and on sandy ground by the sea. Rare. **Lim.**—Curragh Chase. **Clare**—Killeany and Kilmurvy on Inishmore. **Sligo**—Mullaghmore.

§**C. Epilinum** Weihe. FLAX DODDER.—**Gal. W.**—Renvyle, 1832. **Mayo W.**—near Newport, 1840. Not seen since.

SOLANACEÆ.

Solanum Dulcamara L. BITTER-SWEET.—Widespread. Of doubtful standing in some of its stations. Divisions all *except Sligo.*

var. **marinum** Bab.—**Clare**—Inishmore; Kilrush. **Gal. W.**—Renvyle.

***S. nigrum** L. Black Nightshade.—Alien, probably established in Gal. **Lim.**—Limerick, casual. **Gal. W.** and **NE.**—shore at Salthill, Ballyloughaun, and Rinmore. **Mayo E.**—Lough Mask near Ballinrobe.

§**Lycium barbarum** L. *L. chinense* Mill. Tea-plant.—**Lim.**—about Foynes and Newbridge. **Clare**—Killadysert. Not yet established in the west.

***Atropa Belladonna** L. Deadly Nightshade.—**Clare**—established on shores of Coney I. in R. Fergus. **Mayo E.**—L. Mask near Ballinrobe.

Hyoscyamus niger L. Henbane.—Rare, and often irregular in its appearance. **Lim.**—L. Gur. **Clare**—Kilrush R. **Gal. W.**—shore at Galway. **Gal. NE.**—†Oranmore; Rinmore; Ballyloughaun. **Mayo E.**—Ballinrobe. **Mayo W.**—S. Inishkea, long established. **Sligo**—Rosses Point; Raghly.

SCROPHULARINEÆ.

Verbascum Thapsus L. Mullein.—Indigenous or established on limestone rocks, esker ridges, lake and sea-shores, and old walls. Divisions all *except Leit.* Absent from all the larger areas of non-calcareous rocks. Decreases northwards.

§**V. virgatum** Stokes. Large-flowered Mullein.—**Mayo E.**—near Cong, one plant.

***Linaria Cymbalaria** Mill. Ivy-leaved Toadflax.—Divisions all. Frequent.

‡**L. Elatine** Mill. Fluellin.—South only. Rare. A colonist on light cultivated soils. **Lim.**—Rathkeale. **Clare**—Ballyvaughan; Muckinish; Newtown Cashel. **Gal. SE.**—S. of Kinvarra; Castle Taylor.

§**L. purpurea** Mill. Purple Toadflax.—**Lim.**—walls at Mount Trenchard for past 40 years.

‡**L. vulgaris** Mill. Yellow Toadflax.—Calcifuge. Rare, and probably only a colonist. **Lim.**—railway at Adare. **Gal. SE.**—Gort. **Gal. W.**—W. of Galway. **Sligo**—Rosses Point.

***L. minor** Desf. *L. viscida* Mœnch. Lesser Toadflax.—A railway colonist, first observed in Ireland near Cork about 1819. Still almost confined to railway tracks. Decreases northward. Divisions all *except Gal. W., Leit., Ferm.*

***Antirrhinum majus** L. Snapdragon.—An escape, seldom straying beyond garden walls. **Rosc.**—Kilmore Castle.

§**A. Orontium** L. Lesser Snapdragon.—**Clare**—Miltown-Malbay.

Scrophularia aquatica L. Water Figwort.—Divisions all. Local and sometimes rare.

var. **cinerea** Dum.—**Gal. W.**—Oughterard. **Mayo E.**—Cong. **Mayo W.**—Newport.

S. nodosa L. Knotted Figwort.—Divisions all. Frequent.

***Mimulus guttatus** DC. *M. Langsdorfii* Donn. Yellow Monkey-flower.—By rivers, lakes, and estuaries. An American immigrant, thoroughly established. **Lim.**—near Limerick. **Clare**—R. Fergus at Ennis. **Mayo W.**—N. end of Keel L., Achill. **Sligo**—stream at Doonally. **Leit.**—Glenade; west of Saddle Hill; L. Melvin. **Ferm.**—frequent on Lower L. Erne, rare elsewhere.

Limosella aquatica L. Mudwort.—In Ireland confined to one small area as shown below. **Clare**—Inchiquin L.; L. Sillaun; Fisherstreet. **Gal. SE.**—Gort race-course; Tirneevin; Loughmanna.

Digitalis purpurea L. Foxglove. Lus mór (Great Plant); Méiriniḋe ṗúca (Fairy Fingers); Méaraċán dearg (Red Thimble).—Divisions all. Abundant off the limestone. To 1700 feet on Ben Bulben range; 1900 feet on Mweelrea.

Veronica hederæfolia L. Ivy-leaved Speedwell.—Divisions all. Local, but often abundant.

V. agrestis L. Field Speedwell.—Divisions all. Frequent.

V. polita Fr. *V. didyma* Ten. Grey Procumbent Speedwell.—Divisions all *except Ferm.* Commoner than the last.

***V. Tournefortii** C. Gmel. *V. Buxbaumii* Ten. Persian Speedwell.—Divisions all. Common. First noticed in Ireland before 1845, near Cork.

***V. peregrina** L. Wandering Speedwell.—An American weed, naturalized in gardens in the north. **Gal. SE.**—Roxborough. **Rosc.**—Rockingham. **Sligo**—Hazelwood. **Ferm.**—abundant at Enniskillen.

V. arvensis L. Wall Speedwell.—Divisions all. Common.

V. serpyllifolia L. Thyme-leaved Speedwell.—Divisions all. Common.

V. officinalis L. Common Speedwell.—Divisions all. Common. To 1600 feet on Ben Bulben range.

V. Chamædrys L. Germander Speedwell.—Divisions all. Common. To 1330 feet on Mweelrea.

§**V. Teucrium** L.—**Lim.**—overrunning a field near Knockpatrick.

V. montana L. Mountain Speedwell.—Divisions all. Chiefly in hilly country.

V. scutellata L. Marsh Speedwell.—Divisions all. Frequent.

V. Anagallis-aquatica L. WATER SPEEDWELL.—Divisions all. Frequent.

var. **anagalliformis** Bor.—Recorded from Gal. W. and Mayo E. and W. Perhaps common.

V. Beccabunga L. BROOKLIME.—Divisions all. Common. To 950 feet on Ben Bulben range.

Euphrasia officinalis L. EYEBRIGHT. Divisions all. Abundant in its various forms.[1] To 2000 feet on Ben Bulben range; 2390 feet on Twelve Bens.

E. stricta Host.—**Lim.**—Mullough. **Gal. SE.**—Rinville House. **Gal. NE.** — Menlo; Killower L. **Mayo W.** — Ballina.

E. borealis Towns.—**Gal. W.**—Oughterard. **Mayo W.**—Ballina; Rosserk; Derreen; Crossmolina; Achill. **Ferm.**—Lower L. Macnean.

E. brevipila Burn. et Grem.—Divisions all *except Clare.* Abundant. Var. *subglabra* is recorded from near Foxford, E. Mayo.

E. brevipila × **Rostkoviana.**—E. shore of L. Conn, Mayo W.

E. nemorosa Mart.—**Clare**—Murrough (*f. tetraquetra*). **Gal. SE.**—L. Derg; Portumna. **Ferm.**—Florencecourt. Also recorded from "Mayo" in Wettstein's Monograph.

E. curta Fr., var. **glabrescens** Wettst.—**Lim.**—Castle Hewson near Askeaton. **Clare**—Lehinch. **Gal. NE.**—Knockmae. **Gal. W.**—Roundstone. **Mayo W.**—Achill; Mallaranny. **Sligo**—Ben Bulben.

E. foulaensis Towns.—**Mayo W.**—Summit of Croaghaun on Achill.[2] A northern Eyebright, elsewhere in the British Isles known only from the extreme north of Scotland.

E. gracilis Fr.—**Gal. W.**—Clifden; Roundstone. **Gal. NE.** — Annaghdown; Keekill. **Mayo W.** — Keel L. on Achill. **Sligo** — Ballysadare; Ben Bulben. **Leit.** — L. Melvin.

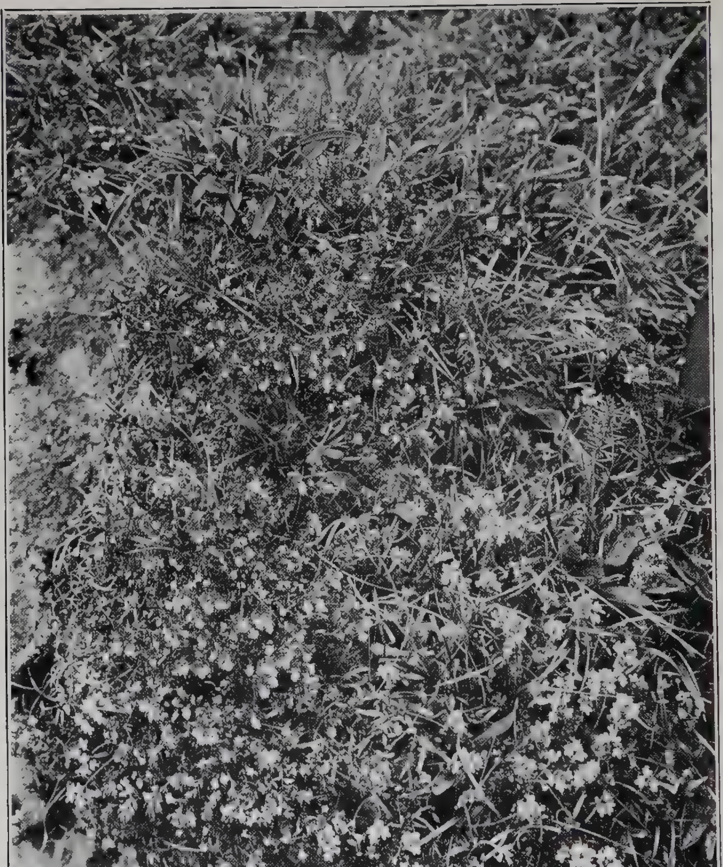
E. scottica Wettst.—**Gal. W.**—Ross L. **Rosc.**—Athlone. **Mayo E.**—east of Foxford. **Mayo W.**—Mallaranny; Ballina; Rathroeen L.; frequent by L. Conn and on Achill I.

E. Rostkoviana Hayne.—**Lim.**—Loghil; Doon. **Gal. SE.**—Marble Hill; Chevy Chase; Woodford. **Rosc.**—Arigna. **Sligo**—Ballysadare.

---

[1] See R. Ll. PRAEGER: Gleanings in Irish Topographical Botany. *Proc. Roy. Irish Acad.*, xxv., Sect. B, 75–79. 1902.

[2] See R. Ll. PRAEGER, *Irish Nat.*, xv., 43. 1906.



EUPHRASIA SALISBURGENSIS AT DOG'S BAY, CONNEMARA.

Growing on a small steep bank beside a granite rock, accompanied by *Thymus Serpyllum*, *Galium saxatile*, *Asperula cynanchica*, *Arabis ciliata*, &c. July, 1908.

R. Welch, Photo.

To face p. 173.

E. salisburgensis Funk.[1]—Generally on limestone pavements and limestone cliffs; widespread and abundant thereon. More rarely on walls, sand-dunes, or non-calcareous rocks. Excepting one station on the limestone in E. Donegal, this plant is confined in the British Isles to our district. Its range on the continent is northern and alpine. **Lim.**—abundant about Askeaton and Mullough; growing on old masonry at Askeaton abbey; Foynes. **Clare**—abundant on the limestone from Rineanna Point through Ennis northward over Burren (to 800 feet) and Aran. Sea-sands at Murrough and Ballyvaughan. On the Calp limestone at Inchicronan L., with such calcifuge species as Digitalis and Athyrium. **Gal. SE.**—Castle Taylor; Garryland; Ardrahan to Kinvarra; frequent in the west. **Gal. W.**—abundant on the limestone area along L. Corrib. On sea-sands at Roundstone and Bunowen; spreading thence on dry ledges and rock-chinks over heathy and moory ground up to 300 feet

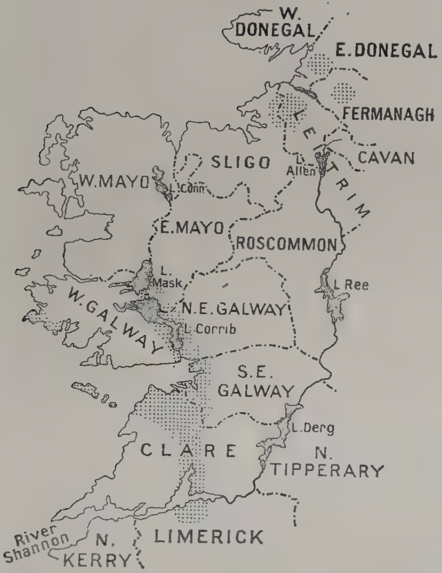


FIG. 15.—Distribution of *Euphrasia salisburgensis.*

---

[1] See F. TOWNSEND: Euphrasia Salisburgensis, Funk, native in Ireland, *Journ. Bot.*, xxxiv., 441–4, tab. 363. 1896. Monograph of the British species of Euphrasia (*E. Salisburgensis*). *Journ. Bot.*, xxxv., 471–3, tab. 376, 380. N. COLGAN: Euphrasia Salisburgensis, Funk, in Ireland. *Irish Nat.*, vi., 105–8, and *Journ. Bot.*, xxxv., 196–9. 1897.

in crevices of granite rocks on Urrisbeg, and over the whole Bunowen peninsula. **Gal. NE.**—common along L. Corrib and the sea-coast, extending inland to Athenry and Knockmae. **Mayo E.** — about Cong, and thence to near Ballinrobe. **Sligo**—Glencar; Annacoona. **Leit.**—plentiful on both sides of Glenade to 1000 feet. **Ferm.**—frequent on the limestone in the hill region SW. of Lower L. Erne. First found by Daniel Oliver on Inishmore in 1852.

This plant is easily recognized in the field by its dwarf bushy growth, characteristic colour, and jagged upper leaves. In vigorous plants the lowest branches are themselves much branched, and almost as long as the main stem, so that a dense roundish bush is produced. The leaves in exposed places assume a rich coppery brown. The plant has a habit of growing in dense clumps, composed of many individuals, in little bare dry patches of ground. The flowers are of medium size, mainly white, and stand out conspicuously against the dark foliage. Flowers July, August.

Bartsia Odontites Huds. RED BARTSIA.—Divisions all. Abundant.

var. **verna** Reich. — **Lim.** — Limerick. **Mayo E.**—Cong. Probably common.

Pedicularis palustris L. LOUSEWORT; MARSH RED RATTLE.—Divisions all. Common. To 1050 feet on Ben Bulben range.

P. sylvatica L. DWARF RED RATTLE.—Divisions all. Common. To 1700 feet on Ben Bulben range; 2050 feet on Mweelrea.

Rhinanthus Crista-galli L. YELLOW RATTLE.—Divisions all. Abundant. To 1630 feet in Mayo.

var. **fallax** Wimm. & Grab.—**Gal. W.**—between Clonbur and Mount Gable.

var. **R. stenophyllus** Schur.—**Gal. W.**—Clonbur. **Rosc.** —Kilteevan.

Melampyrum pratense L. COW-WHEAT.—Divisions all. Frequent in hilly ground. To 2600 feet in Mayo; 2100 feet on Ben Bulben range.

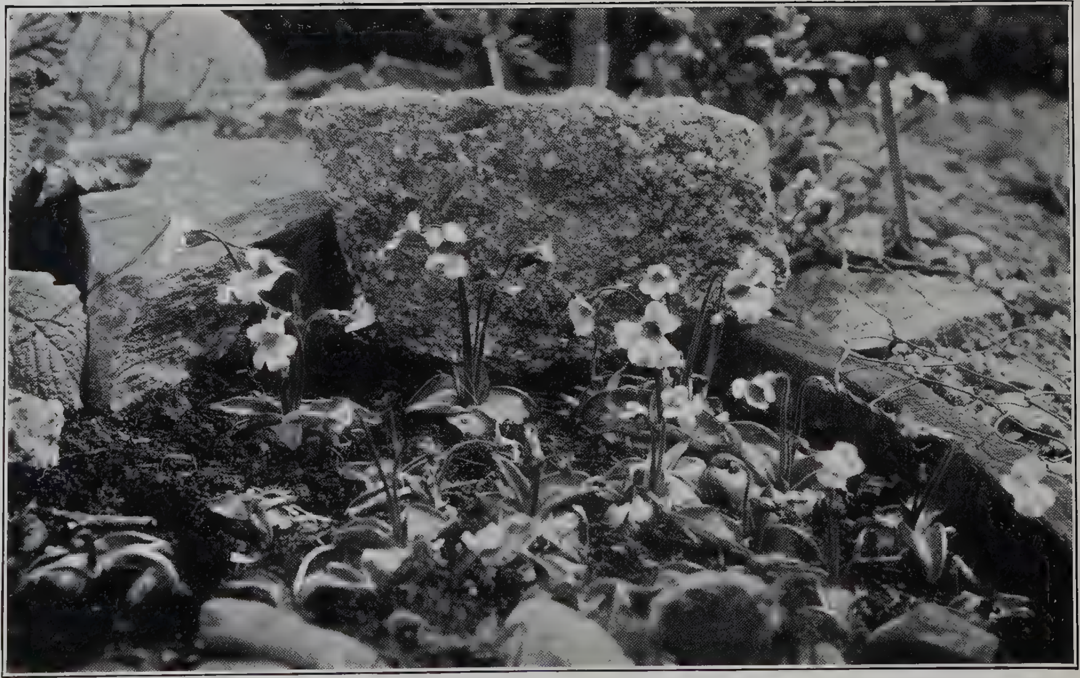
var. **latifolium** Schueb. & Mart.—**Clare**—Inishmore.

var. **ericetorum** Oliver.—**Gal. W.**—Urrisbeg; Craigga More. **Sligo**—Ben Bulben.

var. **montanum** Johnst. **Clare**—Black Head. **Gal. W.**—Carn Seefin. **Mayo W.** —frequent on the mountains. **Sligo** —Ben Bulben; Keshcorran; Carrowkeel. **Leit.**—Slieveanieran; Garadice L.; Lurganboy.

var. **hians** Druce.—**Mayo W.**—frequent in Mallaranny district.

PLATE 23.



PINGUICULA GRANDIFLORA.

In the author's garden in Dublin, May, 1907. Roots from Co. Cork, April, 1907.

R. Welch, Photo.

To face p. 175.

OROBANCHEÆ.

Orobanche rubra Sm. RED BROOMRAPE.—Rare. **Clare**—west of Ennis; abundant on hills S. and E. of Ballvaughan; Muckinish; Poulsallagh. **Gal. W.**—hill near Woodstock; side of L. Corrib; not recently found. **Sligo**—Rosses Point.

O. Hederæ Duby. IVY BROOMRAPE.—Divisions all *except Gal. NE. and Rosc.* Rare though widespread.

§**O. minor** Sm. LESSER BROOMRAPE.—Very rare. Introduced and spreading in Ireland, with a present wide SE. range. **Lim.**—near Foynes.

Lathræa squamaria L. TOOTHWORT.—Woods and thickets. Rare. **Lim.**—Knockaderry. **Clare**—Edendale near Ennis. **Gal. SE.**—St. Cleran's; near Ballinasloe. **Gal. W.**—Ashford. **Rosc.**—"Co. Roscommon." **Ferm.**—Whitepark; near Enniskillen.

LENTIBULARIEÆ.

Utricularia vulgaris L. COMMON BLADDERWORT.—Pools and bog-holes. Frequent. Divisions all *except Ferm.*

U. minor L. LESSER BLADDERWORT.—Generally in bog-holes. Divisions all. Frequent, especially in W. Galway and W. Mayo.

U. intermedia Hayne. INTERMEDIATE BLADDERWORT.—Especially in shallow pools with a soft peat bottom, in which the bladder-bearing branches burrow deeply. I have never seen it flowering; but Mr. Druce got it in bloom at Roundstone in September. **Clare**—Lisdoonvarna; Crusheen; Corofin district. **Gal. SE.**—Marble Hill; L. Derg below Woodford. **Gal. W.**—very frequent. **Gal. NE.**—Menlo; Terryland R. **Rosc.**—Ballinasloe; Corkip L. **Mayo E.**—near Cong. **Mayo W.**—frequent. **Sligo**—L. Gara. **Ferm.**—between Pettigoe and Ballyshannon; Scottsborough; about Carrick L.

Pinguicula vulgaris L. COMMON BUTTERWORT. Leıċ uıꞃᵹe (Rot Water).—Divisions all. Frequent. To 1700 feet on Ben Bulben range; 2050 in W. Mayo.

P. grandiflora Lamk. LARGE-FLOWERED BUTTERWORT.—Confined in the British Islands to SW. Ireland. On the Continent, Iberian and alpine. The single station given is the only one outside of W. Cork and Kerry (where the species is abundant). **Clare**—dripping cliff at Lisdoonvarna. As this lovely plant is known to have been successfully introduced in Co. Wexford, this isolated station has been under some suspicion; but on examination I believe the plant to be probably native there.[1]

P. lusitanica L. Pale Butterwort.—Divisions all. Usually rather rare. Frequent in Gal. W. and Mayo W.

VERBENACEÆ.

‡**Verbena officinalis** L. Vervain.—Roadsides and waste places. An established alien. Has a characteristic limestone range, from N. Lim. across Clare, round the head of Galway Bay, and up both sides of L. Corrib to Cong.

LABIATÆ.

***Mentha rotundifolia** Huds. Round-leaved Mint. An escape. **Lim.**—Lisnagry; Loghil. **Clare**—Canon I.; Edenvale. **Gal. W.**—Roundstone. **Gal. NE.**—near Galway. **Mayo E.**—Ballinrobe. **Mayo W.**—foot of Nephin.

§**M. longifolia** Huds.—**Gal. SE.**—Gort.

***M. piperita** L. Peppermint.—Like the last two. **Lim.**—Loghil; Bilboa River glen. **Gal. W.**—Streamstown. **Gal. NE.**—SW. of Knockmae. **Rosc.**—Slieve Bane; Corkip L. **Mayo E.**—Carrowkeribly L. **Mayo W.**—Cashel on Achill I. **Sligo**—base of King's Mtn. **Leit.**—Garadice L.

M. hirsuta Huds. *M. aquatica* L. Water Mint. Miꞅmín ꝺeaꞃᵹ (Red Mint).—Divisions all. Common.

M. sativa L. *M. aquatica × arvensis.* Marsh Mint.—Divisions all, becoming frequent in the north.

var. **paludosa** (Sole).—**Gal. SE.**—Woodford River. **Gal. W.**—Roundstone.

M. arvensis L. Corn Mint.—Divisions all. Common.

†**M. Pulegium** L. Penny-royal.—Very rare. **Clare**—several stations about Ennis. **Gal. SE.**—roadside below Woodford.

var. **erecta** Syme.—**Lim.**—Rosbrien.

Lycopus europæus L. Gipsywort.—Divisions all *except Mayo E.* Generally frequent, but very rare in Mayo and Sligo.

Origanum vulgare L. Marjoram.—Calcicole. Local, decreasing northwards. Divisions all *except Sligo and Leit.* More abundant in N. Lim., central Clare, and S. Rosc. than elsewhere.

Thymus Serpyllum L. Wild Thyme.—Divisions all. Frequent. To summit of Mweelrea in Mayo—the highest point in the west of Ireland.

T. Chamædrys Fr. Larger Wild Thyme.—**Clare**—Slieve

---

[1] *Irish Nat.*, xvi., 242. 1907.

Carran. **Gal. SE.**—Ardrahan. **Gal. W.**—Roundstone. **Mayo W.** —Sand-dunes W. of Belmullet. **Sligo**—Ben Bulben.

Calamintha officinalis L. *C. montana* Lam. CALAMINT.—Calcicole. Rare, and decreasing northward. **Lim.**—Foynes; Askeaton; Corgrigg. **Clare**—Canon I.; Glanquin; Muckinish; Inishmore. **Gal. SE.**—N. of Gort. **Gal. W.**—Galway; Kilbeg; Oughterard. **Gal. NE.**—Kilcornan; Lackagh. **Rosc.**—L. Ree. **Mayo E.**—Cong.

§**C. Clinopodium** Spenn. *Clinopodium vulgare* L. WILD BASIL.—**Rosc.**—Rockingham.

§**Melissa officinalis** L. COMMON BALM.—**Ferm.**—Trasna I. in Lower L. Erne.

Salvia Verbenaca L. CLARY.—Calcicole. Very rare. **Lim.**—Askeaton. **Clare**—Fort Fergus.

***Nepeta Cataria** L. CAT MINT.—An escape from gardens. Rather rare, but recorded from all divisions *except Gal. NE., Sligo, Leit.*

N. Glechoma Benth. *N. hederacea* Trev. *Glechoma hederacea* L. GROUND IVY.—Divisions all. Common.

Scutellaria galericulata L. GREATER SKULL-CAP.—Lake-margins, &c. Divisions all *except Mayo W.*, but rather rare except in Rosc. and Ferm.

S. minor Huds. LESSER SKULL-CAP.—Boggy places off the limestone. Rare. **Clare**—Monmor bog. **Gal. W.**—throughout, frequent. **Mayo E.**—near Foxford. **Mayo W.**—Pontoon; near Foxford; N. end of L. Mask.

Prunella vulgaris L. SELF-HEAL.—Divisions all. Common. To 1700 feet on Ben Bulben range; 1350 feet on Mweelrea.

***Marrubium vulgare** L. WHITE HOREHOUND.—An escape from cultivation. **Lim.**—Barrigone; Mullough. **Clare**—frequent in N., rare in S. **Gal. W.**—Oughterard.

Stachys palustris L. MARSH WOUNDWORT.—Divisions all. Common.

S. sylvatica L. HEDGE WOUNDWORT.—Divisions all. Common.

S. arvensis L. FIELD WOUNDWORT.—Local, and calcifuge. **Lim.**—Ardagh; frequent about Foynes. **Clare**—rather frequent. **Gal. SE.**—Parkmore; S. of Kinvarra. **Gal. W.**—frequent. **Gal. NE.**—Claregalway. **Mayo E.**—Foxford. **Mayo W.**—frequent.

Galeopsis versicolor Curt. *G. speciosa* Mill. LARGE-FLOWERED HEMP-NETTLE.—Chiefly in potato fields off the limestone. **Lim.**—Foynes; Cahirmoyle. **Clare**—Ennistymon; Lehinch; Miltown Malbay. **Mayo E.**—Callow. **Mayo W.**—near Foxford; Pontoon. **Sligo**—Annaghmore; near Sligo; near Grange.

G. Tetrahit L. Common Hemp-Nettle.—Divisions all. Common, especially off the limestone.

§**Leonurus Cardiaca** L. Motherwort.—**Clare**—Ballyvaughan.

Lamium amplexicaule L. Henbit.—Not common. **Lim.**—Ardagh. **Clare**—Newmarket; Muckinish. **Mayo E.**—Foxford. **Sligo**—Cliffony.

L. intermedium Fr. *L. molucellifolium* Fr. Intermediate Dead-Nettle.—Local. **Lim.**—Foynes; Mungret; Corbally; Doonass. **Gal. SE.**—Gort; Loughrea. **Gal. W.**—Roundstone; Doonloughan. **Gal. NE.**—4 miles N. of Tuam. **Mayo E.**—E. of Foxford. **Mayo W.**—Mallaranny; Ballina; Mullet; and the larger islands. **Sligo**—Mullaghmore; Ben Bulben. **Leit.**—near Kinlough.

L. purpureum L. Red Dead-Nettle. Neantóᵹ caoċ (Blind Nettle).—Divisions all. Common.

L. hybridum Vill. *L. incisum* Willd.—Cut-leaved Dead-Nettle.—Rare. **Lim.**—Cahirmoyle. **Gal. SE.**—Gort. **Gal. NE.**—Dunmore. **Mayo W.**—all the larger islands. **Leit.**—Rinn L.

L. album L. White Dead-Nettle.—Local and rare. **Lim.**—near Morgans; L. Gur. **Gal. SE.**—Portumna. **Rosc.**—Boyle; Athlone; Ballybay. **Sligo**—near Sligo.

‡**Ballota nigra** L. Black Horehound.—Usually escaped from cultivation. Rare. **Lim.**—Plassy. **Mayo E.**—Ballinrobe. The Irish plant is *B. fœtida* Lamk.

Teucrium Scordium L. Water Germander.—An extremely characteristic plant of the lake expansions of the Shannon. Confined in Ireland to the banks of this river and to one small lake in Clare, which lies within the Shannon basin. **Lim.**—Shannon opposite Doonass. **Clare**—Castle Lough near Glanquin, and by L. Derg. No record from the non-limestone part of the L. Derg shores. **Gal. SE.**—abundant on L. Derg; along the Shannon above Portumna. **Rosc.**—abundant on L. Ree. **Leit.**—Shannon below Roosky.

T. Scorodonia L. Wood Sage.—Divisions all. Locally abundant. To 1250 feet on Twelve Bens.

Ajuga reptans L. Common Bugle.—Divisions all. Common.

A. pyramidalis L. Pyramidal Bugle.—Very rare. Dry rocky places, about 50–100 feet elevation. **Clare**—about Kilronan on Inishmore;[1] frequent about Poulsallagh in the townland of Ballyryan, S. of Black Head.[2] **Gal. W.**—Bunowen Hill.[2] The only Irish stations. See plate 16.

---

[1] See N. Colgan, *Journ. Bot.*, xxx., 310. 1892.

[2] See R. Ll. Praeger, *Irish Nat.*, xvi., 241–3. 1907.

PLANTAGINEÆ.

Plantago major L. Way-bread.—Divisions all. Common.

***P. media** L. Lamb's-tongue.—Introduced with grass-seed. **Lim.**—Foynes; Cahirmoyle. **Clare**—Lisdoonvarna; Ballyvaughan. **Gal. W.**—Cong mill-pond. **Mayo E.**—Lisloughrey; Hollymount. **Sligo**—near Cliffony.

P. lanceolata L. Ribwort. Slánlus (Healing Plant).—Divisions all. Abundant. To 2550 feet in Mayo.

P. maritima L. Sea Plantain.—Divisions all *except Rosc., Leit., Ferm.* Plentiful on coasts. Inland on limestone rocks, being an abundant constituent of the "Burren flora," extending over central and N. Clare, along the shores and islands of L. Derg (to 25 miles from the nearest sea), round the head of Galway Bay by Athenry and Tuam, and thence up L. Corrib, L. Mask, L. Carra (as far inland as Claremorris), L. Cullen and L. Conn. Appears again as a common cliff plant in the Ben Bulben district in Sligo and Leitrim, to 1200 feet. Also on non-calcareous rocks in alpine situations on the Galway and Mayo mountains, to 2600 feet; and on Old Red Sandstone ridge N. of Woodford, 400–560 feet.

P. Coronopus L. Buck's-horn.—Common round the whole coast, but not found inland in this district like the last. To 1200 feet on Clare I.

var. **pygmæa** Lange.—**W. Mayo**—Mallaranny.

Littorella lacustris L. *L. uniflora* Aschers. Shore-weed.—Divisions all. Frequent. To 1800 feet in Galway.

ILLECEBRACEÆ.

†**Scleranthus annuus** L. Knawel.—Calcifuge. Rare, and perhaps not native. **Lim.**—Castleconnell. **Gal. W.**—Oughterard. **Mayo W.**—near Levally L.

CHENOPODIACEÆ.

Chenopodium album L. White Goose-foot.—Divisions all. Common. The form *C. candicans* Lamk. seems commoner than *C. viride* L.

C. rubrum L. Red Goose-foot.—Waste and damp ground, mostly by the sea. Rare. **Lim.**—L. Gur, ‡Limerick. **Clare**—Port Couragh on Inishmore. **Gal. SE.**—Newtown near Gort. **Gal. NE.**—Ballyloughaun. **Sligo**—abundant at Raghly.

f. **pseudo-botryoides** H.C. Wats.—**Clare**—turlough near Newtown Gort.

§**C. murale** L. NETTLE-LEAVED GOOSE-FOOT.—**Lim.**—Limerick.

***C. capitatum** L. *Blitum capitatum* Aschers. — **Ferm.** — in fields at Farnaght for over a century past.

***C. Bonus-Henricus** L. GOOD KING HENRY.—A long established herb. Divisions all *except Rosc.*

Beta maritima L. SEA-BEET.—Rather local on the coast, occurring in Lim., Clare, Gal. (3 divisions), Mayo W., Sligo.

Atriplex littoralis L. GRASS-LEAVED ORACHE.—Muddy sea-shores. Very rare. **Clare**—Inishmore; Scattery I. Ranges thence round the south and east coasts of Ireland.

A. patula L. UPRIGHT ORACHE.—Divisions all *except Mayo E.* No doubt frequent everywhere. *A. erecta* Huds. and *A. angustifolia* Smith, which are here grouped together, appear to be about equally common.

A. hastata L. HALBERT-LEAVED ORACHE.—Chiefly on the coast. *Not recorded from Rosc., Mayo E., Leit., Ferm.*, but possibly not absent from any of these.

A. Babingtonii Woods. BABINGTON'S ORACHE.—Sandy sea-shores. Common. Divisions all *except Gal. SE., Rosc., Mayo E., Ferm.*

A. portulacoides L. *Obione portulacoides* Moq. SEA PURSLANE.—Muddy shores. Very rare. **Clare**—Rhyn Point near Ballyvaughan. Ranges thence round the south and east coasts of Ireland.

Salicornia herbacea L. GLASSWORT.—Common on muddy sea-shores everywhere.

Suæda maritima Dum. SEA-BLITE.—With the last.

Salsola Kali L. SALTWORT.—Sandy shores. Common wherever such occur.

POLYGONACEÆ.

Polygonum Convolvulus L. BLACK BINDWEED.—Divisions all. Common.

var. **subalatum** V. Hall.—**Lim.**—common about Limerick. **Gal. W.**—Oughterard.

P. aviculare L. KNOT-GRASS.—Divisions all. Common.

var. **arenastrum** Syme.—**Mayo W.**—Bartraw; Achill.

P. Raii Bab. *P. Roberti* Loisel. RAY'S SEA KNOT-GRASS.—Sandy sea-shores. Local. **Clare** — Miltown Malbay; Lehinch; Aran. **Gal. SE.**—Ardfry House. **Gal. W.**—near Galway. **Mayo W.** — Bartraw; Mullet; Achill; Inishkea; Clare I.

P. Hydropiper L. BITING PERSICARIA. Ȝluıneaċ ꞇeıċ (Hot Kneed-Plant).—Divisions all. Locally common. Calcifuge.

P. minus Huds. Narrow-leaved Persicaria.—Lake-shores chiefly. Local. **Gal. NE.** — Tuam. **Rosc.** — L. Allen at Arigna. **Mayo E.**—L. Cullin. **Mayo W.** — E. shore of L. Conn; L. Cullin. **Sligo**—near Sligo. **Leit.**—Garadice L. **Ferm.**—Gubbaroe Point on Lower L. Erne.

P. mite Schrank. Lax-flowered Persicaria. — Apparently extremely rare. **Lim.**—Abbey River near Limerick. **Leit.**—roadside in Glenade.

P. Persicaria L. Spotted Persicaria. Ᵹluıneaċ ꝺeaꞃᵹ (Red Kneed-Plant).—Divisions all. Abundant.

P. lapathifolium L. Glandular Persicaria.—Divisions all. Frequent.

P. amphibium L. Water Bistort.—Divisions all. Common, both in the typical form and as var. *terrestre* (Leers).

‡**P. Bistorta** L. Snakeweed.—A relic of cultivation. Rare. **Lim.**—Ballingarry. **Clare**—Killaloe. **Gal. SE.**—near Ballinasloe. **Sligo**—south of Sligo. **Leit.**—Rinn L. **Ferm.**—Ely Lodge; Castle Coole.

P. viviparum L. Alpine Bistort.—Very rare. **Sligo**—N. slope of Ben Bulben, 500-1200 feet; Ben Whiskin. **Leit.**—Glenade. Elsewhere in Ireland only in Kerry and Donegal.

§**P. Bellardi** All.—**Lim.**—casual at Limerick.

§**Fagopyrum esculentum** Mœnch. *F. sagittatum* Gilib. Buckwheat.—**Leit.**—near Kinlough. Casual.

Oxyria digyna Hill. *O. reniformis* Hook. Mountain Sorrel.—Wet mountain cliffs. **Gal. W.**—Ben Lettery; Muckanaght; Lough-na-dirk-more at Maamtrasna. **Mayo W.**—Mweelrea; Loughty Mtn.; Sheffry; Bengorm; Croaghpatrick; Cushcamcarragh; Clare I.; Achill I.; 1470-2400 feet. **Sligo**—frequent on the Ben Bulben range, 1200-1950 feet. **Leit.**—Glenade.

Rumex conglomeratus Murr. Sharp-leaved Dock.—Divisions all. Common.

R. sanguineus L. Bloody Dock.—**Gal. SE.**—Castle Taylor. **Mayo W.**—near Bingham Castle. Very rare and perhaps introduced.

var. **viridis** (Sibth.). *R. nemorosus* Schrad. Wood Dock.—Divisions all. Generally common, but absent from the extreme western districts, such as the Mullet and the Mayo islands.

R. maritimus L. Golden Dock.—Very rare. **Lim.**—edge of L. Gur.

R. obtusifolius L. Broad-leaved Dock. Copóᵹ ꞅꞃáıꝺe (Roadside Leaf).—Divisions all. Common.

R. crispus L. Curled Dock.—Divisions all. Common.

R. Hydrolapathum Huds. Water Dock.—Lowland watery places. Divisions all *except Mayo E.*, but very rare in Gal. W., Mayo W., and Ferm.

R. Acetosa L. Sorrel.—Divisions all. Common. Ascends to the highest summits.

§**R. scutatus** L. French Sorrel.—**Clare**—old walls near Lisdoonvarna; a relic of cultivation.

R. Acetosella L. Sheep's Sorrel. Saṁaḋ caoraċ (Sheep's Sorrel).—Divisions all. Common, especially in dry peaty ground. Ascends to the highest summits.

EUPHORBIACEÆ.

Euphorbia Helioscopia L. Sun Spurge.—Divisions all. Common.

E. hiberna L. Irish Spurge. bainne caoin (Mild Milk [ironical]).—Very local. **Lim.**—abundant at Abbeyfeale, and thence up the Galey River; Adare. **Gal. SE.**—plentiful by the Owendalulleegh R. from near L. Cooter past Chevy Chase, through the townlands of Derrybrien[1] South and East. **Mayo W.**—Inishturk.

This species, whose only station in Great Britain is in Devonshire, has its Irish headquarters south of our district, in Cork and Kerry, where it is abundant (see plate 24). North of our district it is found only in two localities in Donegal. Excepting the station at Adare (which, though not since verified, rests on the high authority of A. G. More), all the Irish stations lie off the limestone. The Limerick localities are stream-sides on the Coal-measures, the Galway one stream-sides on Old Red Sandstone, the Inishturk one heathy slopes on Silurian rocks.

E. Paralias L. Sea Spurge.—Sandy shores. Rare. **Clare**—Ballyvaughan; Fanore; Inishmore; Inishmaan. **Gal. W.**—Inveran; near Galway.

E. portlandica L. Portland Spurge.—Sandy shores. Rare. **Clare**—Fort Fergus; Fanore; Inishmore; Inishmaan. **Gal. W.**—near Slyne Head.

E. Peplus L. Petty Spurge.—Divisions all. Common.

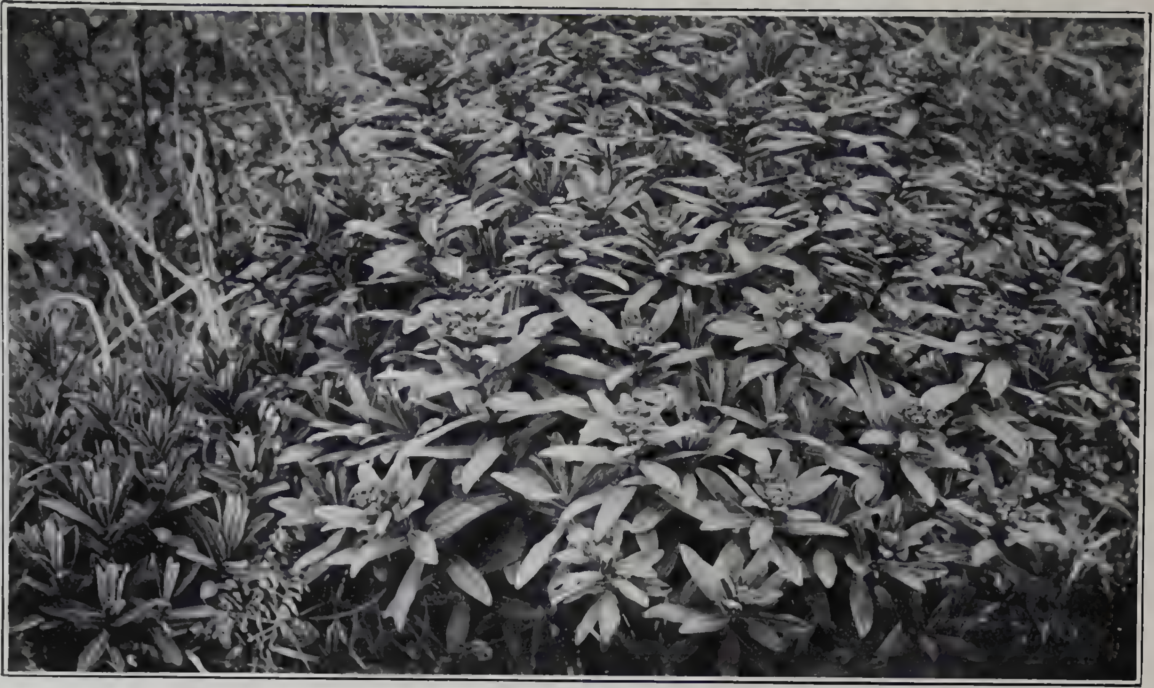
E. exigua L. Dwarf Spurge.—Frequent in S. half of district; absent from N. half (*i.e.* from *W. Mayo, Sligo, Leit., and Ferm.*).

†**Mercurialis perennis** L. Dog's Mercury.—Woods and thickets. Rare, and not certainly native. **Clare**—Khyber

---

[1] The Derryea of H. C. Hart's original record, *Journ. Bot.*, 1873, p. 338.

PLATE 24.



EUPHORBIA HIBERNA

In woods at Kenmare, Co. Kerry, growing among Brambles and Ferns May, 1898.

R. Welch, *Photo.*

To face p. 182.

Pass S. of Bell Harbour; Deelan More, Deelan Beg, and Gortyclare, all SE. of Ballyvaughan; Ennis. **Sligo**—Hazelwood.

§**M. annua** L. French Mercury.—Very rare. **Clare**—Ennis, probably casual.

URTICACEÆ.

Ulmus montana Stokes. *U. glabra* Huds. Wych Elm.—Frequent, but rare in places not open to suspicion of introduction. It appears to be truly native in the stations given below. **Lim.**—mountain glen above Doon; White River. **Mayo E.**—islands in L. Carra. **Sligo**—limestone cliffs of Keshcorran. **Leit.**—limestone rocks in Glenade. **Ferm.**—glens near Derrygonelly.

***Humulus Lupulus** L. Hop.—An occasional relic of cultivation. **Lim.** — Castleconnell; Limerick; Foynes; Cahirmoyle. **Clare** — Bunratty; Fergus islands; Ennis; Ballycar; Inishmore. **Gal. SE.**—Beagh I. in L. Cooter. **Mayo E.**—Foxford.

Urtica dioica L. Great Nettle. Neantóg.—Divisions all. Abundant. To 1200 feet on Ben Bulben range.

U. urens L. Small Nettle.—Divisions all. Frequent.

Parietaria officinalis L. *P. ramiflora* Mœnch. Wall Pellitory.—Walls and rocks. Divisions all *except Ferm.*, but very rare in Gal. W., Rosc., Mayo W., Sligo, Leit.

§**Cannabis sativa** L. Hemp.—**Lim.**—casual at Limerick.

MYRICACEÆ.

Myrica Gale L. Bog Myrtle. Rileóg. — Divisions all. Frequent.

CUPULIFERÆ.

Betula verrucosa Ehrh. White Birch.—Chiefly on edges of lowland bogs and lakes in the limestone plain. Local. **Lim.**—Thornfields; White R. **Clare**—Killadysert; Inchicronan L.; Ballyline House. **Gal. SE.** —Woodford; Frequent on L. Derg. **Gal. W.**—Clonbur. **Gal. NE.**—Clonbrock. **Rosc.** — Mote Park; Athlone. **Mayo E.** — Claremorris; Clonbur. **Leit.**—Rinn L.; Glenade.

B. pubescens Ehrh. *B. tomentosa* Reith. & Abel. Common Birch. beiṫ.—Divisions all. Frequent in the plain and on the hills. To 1500 feet in Mayo.

var. **denudata** Gren. et Godr. **Lim.**—Thornfields.

Alnus glutinosa Gærtn. *A. rotundifolia* Mill. ALDER. Fearnóg.—Divisions all. Frequent.

Corylus Avellana L. HAZEL. Coll.—Divisions all. Common. Covers large areas of limestone crags. To 1200 feet on Ben Bulben range; 1100 feet on Twelve Bens.

Quercus Robur L. OAK. Dair.—Divisions all. Frequent. Usually in the var. *pedunculata* Ehrh. Clearly indigenous in mountain districts, islands in lakes, and rough ground. To 750 feet on Mweelrea.

The range of the segregates *Q. pedunculata* Ehrh. and *Q. sessiliflora* Salisb. has not yet been worked out. The present indications regarding their general distribution suggest that the Oaks of the metamorphic areas are the latter, while those of the limestone pavements are *Q. pedunculata*; but there are not yet a sufficient number of records to allow of this generalization being stated definitely.

SALICINEÆ.

Salix pentandra L. BAY WILLOW.—Frequent in the north, decreasing southward. **Lim.**—Mountshannon; Cahirmoyle. **Clare**—R. Annagh. **Gal. SE.**—R. Suck near Ballinasloe. **Gal. W.**—rather frequent. **Gal. NE.**—Clonbrock. **Rosc.**—near Athlone. **Mayo E.**—L. Carra. **Mayo W.**—L. Conn; ‡Ballina. **Sligo, Leit., Ferm.**—frequent.

S. pentandra × fragilis. *S. cuspidata* Schultz.—**Gal. W.**—*Maam. **Mayo E.**—*Cong.

S. triandra L. ALMOND-LEAVED WILLOW.—Very rare. **Lim.**—†near Limerick. **Ferm.**—Florencecourt (an old record needing confirmation).

S. triandra × fragilis. *S. decipiens* Hoffm. **Lim.**—near Limerick.

‡**S. fragilis** L. CRACK WILLOW.—Rare, and probably planted. **Lim.**—Hermitage; near Limerick. **Clare**—Dromore L. **Sligo**—Ballymote. **Leit.**—L. Melvin.

S. fragilis × alba. *S. viridis* Fr.—**Lim.**—Newbridge; Limerick.

†**S. alba** L. WHITE WILLOW.—Divisions all *except Gal. W., Mayo E.* Status difficult to decide, as in the case of other lowland willows. Probably originally native.

S. cinerea L. COMMON SALLOW.—Divisions all. Common. Ascends to 1350 feet in Mayo.

S. aurita L. ROUND-EARED SALLOW.—Divisions all. To 2100 feet on Ben Bulben range.

S. aurita × cinerea. *S. lutescens* A. Kern.—**Lim.**—Thornfields; Mullough; near Foynes. **Gal. W.**—Maam.

S. Caprea L. Great Sallow.—Divisions all. Frequent. To 1400 feet in Leitrim.

S. repens L. Dwarf Silky Willow.—Divisions all. Frequent but local. To 1200 feet on Maam Turk.

S. repens × aurita. *S. ambigua* Ehrh.—**Gal. W.**—Tully. **Sligo**—NW. side of Ben Bulben, 1300 feet.

S. phylicifolia L. Tea-leaved Sallow.—Rare and local. **Mayo W.**—stream out of Lugaloughaun L. on Mweelrea, 550–1010 feet. **Sligo**—frequent on Ben Bulben range to 1400 feet. **Leit.**—near Kinlough.

‡**S. viminalis** L. Osier.—Divisions all. Frequent, but probably nowhere indigenous.

S. viminalis × Capreæ. *S. Smithiana* Willd.—Frequent. Divisions all *except Clare, Gal. SE. and NE., Mayo E. and W.*

S. viminalis × Caprea. *S. sericans* Tausch.—**Rosc.**—Rockville.

S. herbacea L. Dwarf Mountain Willow.—Local on the mountains. **Lim.**—Galtymore. **Gal. W.**—frequent on Twelve Bens. **Mayo W.**—frequent on higher grounds, from 1200 feet on Achill to 2600 feet on Mweelrea. **Sligo**—Cloonacool L.; Ben Bulben; Annacoona; 1700-1950 feet.

†**S. purpurea** L. Rose Willow.—A doubtful native, increasing northward. Divisions all *except Gal. W.*

***S. purpurea × viminalis.** *S. rubra* Huds.—**Lim.**—Limerick. **Mayo E.**—E. of Foxford. **Sligo**—L. Gill. **Leit.**—L. Gill; Annaghearly L.

var. **Forbyana** (Sm.)—**Leit.**—Annaghearly L.

Populus tremula L. Aspen.—Native on mountain cliffs, rocky lake shores, and wild ground, in Clare, Gal. W. and NE., Rosc., Mayo E. and W., Sligo, Leit., Ferm. Spreads to the western islands. Doubtfully indigenous in Lim.

var. **glabra** Syme.—**Lim.**—†Adare. **Gal. W.**—Clonbur.

EMPETRACEÆ.

Empetrum nigrum L. Crowberry.—Local; ascending to the highest summits and often descending to sea-level. Divisions all *except Lim., Mayo E.* Frequent in N. Clare, Gal. W., Mayo W.

CERATOPHYLLEÆ.

Ceratophyllum demersum L. Hornwort.—Very rare. **Lim.**—L. Gur. **Clare**—by R. Fergus near Ennis; near Dromore L. **Mayo W.**—Newtown L. on the Mullet.

CONIFERÆ.

Juniperus communis L. COMMON JUNIPER.—Local. **Gal. SE.**—frequent about L. Derg. **Gal. W.**—Lisoughter; Roundstone. **Gal. NE.**—Merlin Park. **Mayo E.**—common about L. Carra. **Mayo W.**—Glencullen Mtn.; Delphi Mtn. to 1550 feet. **Sligo**—Knockachree in Ox Mtns.

J. nana Willd. *J. sibirica* Burgsdorf. DWARF JUNIPER.—Rather frequent. Often on low-lying limestones, as well as on mountains. **Lim.**—Barrigone. **Clare**—frequent in the centre, Burren, and Aran. **Gal. SE.**—frequent in W. **Gal. W.**—frequent throughout; ascends to 2200 feet. **Gal. NE.**—abundant on Athenry esker. **Mayo E.**—SW. side of L. Conn. **Mayo W.**—frequent but local; sea-level on Achill. **Sligo**—Ben Bulben; sea-level at Rosses Point. **Leit.**—on the coast. **Ferm.**—Carrick Hill; above Doagh L.

Taxus baccata L. YEW. Iuḃar.—Formerly abundant; still frequent locally, chiefly on limestone cliffs and pavements. On islands in lakes in the metamorphic area in Gal. W. **Clare**—Doonass; frequent in centre and Burren. **Gal. SE.**—Garryland; Kilmacduagh. **Gal. W.**—L. Inagh; Craigga More; frequent on E. margin. **Gal. NE.**—Donamon. **Mayo E.**—W. side of L. Carra; ‡L. Mask below Ballinrobe. **Mayo W.**—SW. shore of L. Conn. **Sligo**—cliffs of Seefin; islands in L. Gill. **Leit.**—L. Gill; Glencar; Glenade. **Ferm.**—frequent on limestone on the hills SW. of Lower L. Erne. To 900 feet on Ben Bulben range.

The Irish or Florencecourt Yew, var. *fastigiata* (Lindl.), now so common in cultivation, had its origin in two seedlings found wild by Mr. George Willis about 1767 on a limestone rock at Carrick-na-madadh above Florencecourt, Co. Fermanagh; one of the original specimens still grows in Florencecourt demesne. These plants were females, and consequently all the specimens in cultivation (which have been produced by cuttings) are females also. Seeds are usually produced in abundance by natural crossing with the common Yew, but almost invariably these seeds reproduce the typical form, not the variety. Dr. Maxwell Masters considered the Florencecourt Yew to be a juvenile form of the species, in which the characters of the seedling (the radial disposition of the leaves and the upright habit) are preserved throughout the life of the plant.[1]

---

[1] See *Gard. Chronicle*, 3rd Series, x., 68, 1891; Elwes and Henry: Trees of Great Britain and Ireland, I., 110–111, 1906; *Irish Gardening*, III., 172–173, 1908.

***Pinus sylvestris** L. Scotch Fir.—Reproduces itself abundantly on planted islands in L. Mask, and is spreading to non-wooded islands. Naturalized also in other places, but particulars are wanting.

HYDROCHARIDEÆ.

***Elodea canadensis** Michx. *Anacharis Alsinastrum* Bab. Water Thyme; Canadian Weed.—Divisions all *except Mayo W.* In Gal. W. along E. margin only. Rare in S., frequent in N. Introduced into NE. Ireland about 1836, whence it spread very rapidly; now decreasing in many places.

Hydrocharis Morsus-ranæ L. Frog-bit.—Rare. **Clare**—S. of Templebannagh L.; plentiful about Ennis. **Gal. SE.**—Portumna; near Rossmore. **Rosc.**—Rinanny Point on L. Ree. **Leit.**—Carrick-on-Shannon; Rinn L. **Ferm.**—near Pettigoe.

‡**Stratiotes Aloides** L. Water-soldier.—Very rare. **Ferm.**—known about Upper L. Erne for over a century, and recently seen at Belleisle. Rare and of uncertain appearance in Ireland, and probably not indigenous. The above is the most satisfactory of its Irish stations.

ORCHIDEÆ.

Malaxis paludosa Swartz. Bog Orchis.—Spongy bogs. Very rare. **Clare**—near Lisdoonvarna. **Gal. SE.**—bog by L. Derg S. of Woodford. **Gal. W.**—base of Carn Seefin. Quite lowland in these stations.

Neottia Nidus-avis Rich. Bird's-nest.—Woods and thickets. **Lim.**—Curragh Chase; Mount Trenchard. **Gal. SE.**—Kilcornan. **Gal. W.**—Oughterard; Ashford. **Gal. NE.**—Clonbrock. **Rosc.**—Rockingham. **Mayo E.**—both sides of L. Carra. **Sligo**—frequent round L. Gill. **Ferm.**—frequent.

Listera cordata Br. Heart-leaved Twayblade.—Local, and absent from the south. **Gal. W.**—Corcogemore; Lusteenmore I. in L. Mask, 70 feet elevation. **Mayo E.**—½ mile W. of Partry, 100 feet elevation. **Mayo W.**—Mallaranny; Corslieve; Croaghpatrick; Achill; Clare I. **Sligo**—frequent on Ben Bulben range to 2000 feet. **Leit.**—Slieveanieran; Slievenakilla. **Ferm.**—above Florencecourt; common on sandstone escarpments in Carrick district, 400–1000 feet.

L. ovata Br. Twayblade.—Divisions all. Frequent. To 1500 feet in Sligo.

Spiranthes autumnalis Rich. *S. spiralis* Koch. Fragrant

Lady's Tresses.—Frequent; absent from the north. **Lim.**—Askeaton. **Clare**—about Ennis; frequent in Burren; three Isles of Aran; Miltown Malbay. **Gal. SE.**—abundant in west; Portumna. **Gal. W.**—Sand-dunes at Dog's Bay; Ashford; Ard near Oughterard. **Gal. NE.**—abundant in SW. **Mayo E.**—L. Carra; Houndswood.

Has a typical "Burren" distribution, following the bare limestone from Limerick to Mayo. Elsewhere in Ireland it is not confined to limestone.

Cephalanthera ensifolia Rich. *C. longifolia* Fritsch. Narrow-leaved White Helleborine.—Wet woods and thickets. Very rare. **Gal. SE.**—abundant in Derryvunlam wood near Loughrea. **Mayo W.**—Pontoon bridge.

Epipactis latifolia All. *Helleborine latifolia* Druce. Broad-leaved Helleborine.—Widespread but not common. Divisions all *except Gal. NE., Rosc.* Frequent in Ferm. only.

E. atro-rubens Schultz. *E. ovalis* Bab. *Helleborine atro-rubens* Druce. Oval-leaved Helleborine.—Stony limestone hills. Local. **Clare**—Dromoland; L. Fin; Shandangan L.; locally abundant in Burren. **Gal. SE.**—hills S. of Kinvarra. **Gal. W.**—near Cong. **Gal. NE.**—Knockmae.

Not found elsewhere in Ireland. Range about 100–1000 feet.

E. palustris Crantz. *Helleborine longifolia* Rendle and Britten. Marsh Helleborine.—Rather local. Chiefly on the limestone. Divisions all, but one station only in Leit., Ferm. Frequent in Clare and Gal. SE.

Orchis pyramidalis L. Pyramidal Orchis.—Divisions all, often abundant, but very local, following the limestone and decreasing northward. On sea-sands off the limestone occasionally.

O. morio L. Green-winged Orchis.—Local, and absent from the north. **Clare**—Muckanagh L. **Gal. SE.**—frequent. **Gal. W.**—Ross L.; frequent in Roundstone district. **Gal. NE.**—Knockmae. **Rosc.**—rather frequent. **Mayo E.**—L. Carra; Claremorris. **Mayo W.**—near Rosserk Abbey. **Sligo**—between Glencar and Sligo.

O. mascula L. Early Purple Orchis.—Divisions all. Frequent.

O. incarnata L. Common Marsh Orchis.—Divisions all. Frequent. To 1000 feet in Mayo.

O. latifolia L. Broad-leaved Marsh Orchis.—Apparently rare. **Lim.**—Curragh Chase. **Gal. W.**—Maam. **Gal. NE.**—Clonbrock. **Mayo E.**—Cong; L. Carra. **Mayo W.**—Mallaranny. **Sligo**—Inishmurray.

O. maculata L. Spotted Orchis.—Divisions all. Common. To 2100 feet on Ben Bulben range; 2400 feet on Mweelrea.

Ophrys apifera Huds. Bee Orchis.—Frequent but local, strictly following the limestone. **Lim.** — Robertstown; Adare; Curragh Chase; Limerick. **Clare**—frequent; extends to Fergus islands and Inishmore. **Gal. SE.**—in the SE. and SW. **Gal. W.**—Gentian Hill; Ballycuirke L.; Cong district. **Gal. NE.**—Merlin Park; Athenry esker; Doon near Clonbrock; L. Corrib at Kilbeg. **Rosc.**—Athlone; Mount Talbot. **Mayo E.**—frequent in SW. **Mayo W.**—west of Castlebar. **Sligo** — Sligo harbour; Knocknarea; Rosses Point; Lissadill. **Ferm.**—Long I. in Lower L. Erne; Drumcore; near Ely Lodge.

O. muscifera Huds. Fly Orchis.—On the limestone. Local, and absent from the north and south. **Clare**—Turlough hills; Glanquin. **Gal. SE.**—frequent in west. **Gal. W.**—about Ross L. and Gortachalla L. **Gal. NE.**—Coolaran; plentiful on Athenry esker; Glencorrib near Headford. **Mayo E.**—both sides of L. Carra.

Habenaria conopsea Benth. *Gymnadenia conopsea* Br. Fragrant Orchis.—Divisions all. Frequent and often abundant, especially on the limestone. Very rare in the metamorphic area of Galway and Mayo, but occurs on sea-sands at Bunowen and on the Mullet. To 900 feet in Clare.

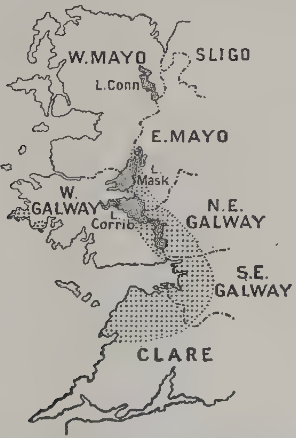


Fig. 16.—Distribution of *Habenaria intacta.*

H. intacta Benth. *Neotinea intacta* Reich. Close-flowered Orchis.—One of the most famous plants of the district, and not found elsewhere in the British Isles nor in northern

Europe. Its foreign range embraces the whole shores of the Mediterranean. First found[1] in Ireland by Miss F. M. More, in 1864, at Castle Taylor, SE. Galway. Now known to have a wide distribution of "Burren" type over the area of bare limestone, with interesting outliers. See fig. 16 and frontispiece. **Clare**—locally abundant throughout Burren, on hillsides, pasture fields, and roadsides, at small elevations. Apparently absent from Aran, and not yet recorded from central Clare, where it probably occurs. On Coal-measure shales between Lehinch and Ennistymon. **Gal. SE.**—frequent in W. **Gal. W.**—frequent on the limestone about Moycullen and Ross. Sparingly at Dog's Bay and on the Bunowen peninsula, in sandy or light moory soil on metamorphic rocks. **Gal. NE.**—by L. Corrib at Keekil; frequent in SW. **Mayo E.**—Cong, and NE. shore of L. Corrib near Cong; three stations on west side of L. Carra; NE. shore of L. Mask.

The plant appears above ground in October, sending up two short, broad, acute glaucous leaves, which can withstand hard frost. Flowers in the middle of May. The blossoms are of a slightly greenish white—never pink, as figured in Sowerby's "English Botany." In summer easily recognized by the short fruit-stem with close-ranked capsules, which is dead and dry by the end of June, but persists till autumn if not trampled.

H. albida Br. *Gymnadenia albida* Rich. WHITE MOUNTAIN ORCHIS.—Pastures and heaths. Rare. **Clare**—Black Head; Kilmoon; Lisdoonvarna. **Gal. SE.**—Dalystown; Moyode; St. Cleran's; descends to about 100 feet. **Gal. W.**—Benwee; Mount Gable; Ben Leir near Glantraigue. **Mayo E.**—Ballinrobe; near Foxford. **Mayo W.**—Mweelrea; hill S. of Leenane at 1600 feet. **Sligo**—Ballysadare; Ben Whiskin; Glencar; King's Mtn. **Leit.**—near Mohill. **Ferm.**—Poulaphuca.

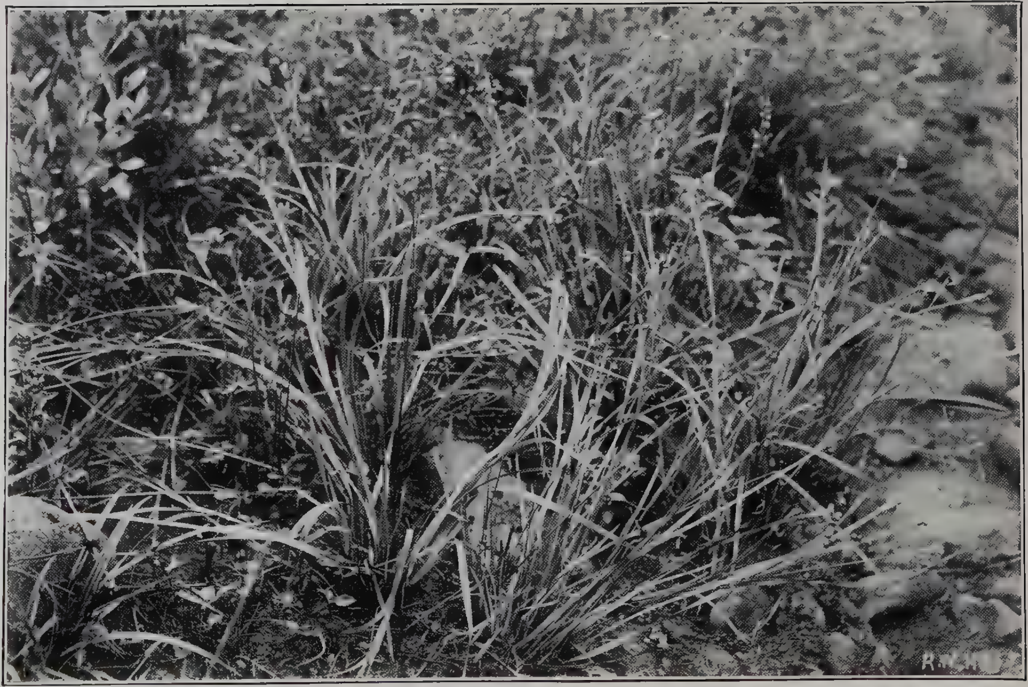
H. viridis Br. FROG ORCHIS.—Divisions all. Frequent. To 1075 feet in Clare.

H. bifolia Br. LESSER BUTTERFLY ORCHIS.—Divisions all. Frequent.

H. chloroleuca Ridley. *H. chlorantha* Bab. *H. virescens* Druce. GREATER BUTTERFLY ORCHIS.—Divisions all. Frequent.

---

[1] D. MOORE: *Neotinea intacta* Reichb., a recent addition to the British Flora. *Journ. Bot.*, ii., 228–9. 1864. H. G. REICHENBACH: *Neotinea intacta*, Reichb. fil., the new Irish Orchid. *Journ. Bot.*, iii., 1-5, tab. 25. 1865.



SISYRINCHIUM ANGUSTIFOLIUM AT WOODFORD, CO. GALWAY,
Growing in gravelly stream-bed, accompanied by *Senecio aquaticus*, *Prunella vulgaris*, *Juncus lamprocarpus*, &c
July, 1908.

R. Welch, Photo. *To face p. 191.*

IRIDEÆ.

***Iris fœtidissima** L. GLADDON; STINKING IRIS.—A naturalized escape. **Lim.**—Foynes I.; Curragh Chase. **Clare**—Murrough; Ballycar L.; Ennis. **Gal. SE.** — near Loughrea; Castle Taylor. **Gal. NE.**—Clonbrock. **Mayo E.**—Ballinrobe; L. Carra; Foxford; near Shrule. **Mayo W.** — occasionally between Westport and Louisburgh.

I. Pseudacorus L. YELLOW FLAG. Eleastrom; Seilistrom.—Divisions all. Common. To 1100 feet in Sligo. Covering low sand-dunes at Keel on Achill I.

var. **acoriformis** (Boreau).—**Mayo W.**—Mallaranny district; apparently the prevailing Irish form.

Sisyrinchium angustifolium Mill. *S. anceps* Cav. *S. Bermudiana* L. BLUE-EYED GRASS.—Very local. **Clare**—Scarriff. **Gal. SE.**—abundant about Woodford, and thence to near Portumna. **Sligo**—abundant in meadows at N. side of entrance to Glencar, below Seefin (King's Mtn. of Ordnance map). **Ferm.**—plentiful on W. shore of Upper L. Erne at Derryvore, opposite Crum Castle.

First found in Ireland at Woodford in 1845 by James Lynam. Grows outside our district in Kerry and West Cork, and on the Tipperary shore of L. Derg opposite Woodford. A native of N. America, unknown elsewhere in Europe save as an acknowledged introduction. The fact that the plant has proved a successful colonist elsewhere, as in Queensland and Germany, has caused its standing in Ireland to be questioned. It is now known from many widely separated stations in very wild ground, into which it is difficult to see how it could have been introduced. The latest opinion on this subject of Dr. Scully—than whom no Irish botanist is better fitted to judge, on account of his long and intimate acquaintance with the Kerry flora—is emphatic on this point:—"The more I see of the distribution of this plant in Kerry the more I am inclined to consider it indigenous there."[1] It is not found about villages or gardens, or other usual foci of the alien flora.

AMARYLLIDEÆ.

***Narcissus biflorus** Curtis. PALE NARCISSUS.—A naturalized relic of gardens. **Lim.**—Morena Point near Askeaton among native scrub. **Clare**—sandy pastures near Kilronan on Inishmore; abundant on Inishcaltra; Donough's I. near Limerick.

---

[1] *Irish Nat.*, xvii., 53. 1908.

†**Leucojum æstivum** L. Snowflake.—Probably native; at least thoroughly naturalized in the Shannon marshes. **Lim.**—Ballinacurra Creek; above the railway bridge over the Shannon; by R. Maigue below Adare. **Clare**—Parteen, over a large area of marsh. **Ferm.**—damp meadow at Lisgoole.

DIOSCORIEÆ.

***Tamus communis** L. Black Bryony.—**Sligo**—in wild places at Hazelwood and Rockwood for the last forty years at least.

LILIACEÆ.

‡**Allium Babingtonii** Borrer. Bulb-bearing Leek.—Naturalized on the west coast of Ireland. **Clare**—common on all three Isles of Aran. **Gal. W.**—Roundstone and westward; Inishbofin. **Gal. NE.**—Menlo. **Mayo W.**—between Croagh-patrick and the sea; Inishturk. Elsewhere in Ireland in Donegal only.

A. vineale L. Crow Garlic.—Very rare. **Lim.**—Barrigone; Loghil; Askeaton; Limerick; L. Gur. **Clare**—Long-pavement. **Mayo E.**—near Cong church.

var. **compactum** (Thuill.)—**Lim.**—Limerick.

† **A. Schænoprasum** L. Chives.—Very rare. **Mayo E.**—on limestone crags S. of L. Mask. Believed by the finder (Rev. E. S. Marshall) to be native.

A. ursinum L. Ramsons. Gairleóg.—Divisions all. Frequent. To 1050 feet in Leitrim.

Scilla nutans Sm. *Endymion nutans* Dum.; *Scilla non-scripta* Hoffmgg. & Link. Wild Hyacinth.—Divisions all. Common. To 1350 feet on Ben Bulben range.

§**Asphodelus fistulosus** L. **Lim.**—casual at Limerick.

Narthecium ossifragum L. Bog Asphodel.—Divisions all. Common. To 2050 feet in Mayo; 1700 feet on Ben Bulben range.

JUNCACEÆ.

Juncus bufonius L. Toad Rush.—Divisions all. Common.

J. squarrosus L. Heath Rush.—Divisions all. Abundant off the limestone, up to the highest summits.

J. Gerardi Loisel. Round-fruited Rush.—Common along the whole coast-line.

J. tenuis Willd. Slender Rush.—Very rare. **Clare**—Salt-marsh near Kilronan on Inishmore. Elsewhere in Ireland only in Kerry and W. Cork, where it is locally abundant, and has all the appearance of a native; and at Belfast. It is a N. American species, known to have migrated recently to stations in both northern and southern Europe, and it cannot with certainty be allowed native rank in Ireland at present.

J. glaucus Ehrh. *J. inflexus* L. Hard Rush.—Divisions all. Abundant on the limestone, rare elsewhere.

J. effusus L. Loose-flowered Rush. — Divisions all. Common. To 1920 feet in Mayo. A form with stems spreading in all directions occurs in SW. Clare, on Inishturk and Achill I. in W. Mayo, and on Inishmurray in Sligo.

J. effusus × glaucus. *J. diffusus* Hoppe.—**Clare**—Cross; Carrigaholt.

J. conglomeratus L. Common Rush.—Divisions all. Less abundant than the last. To 1850 feet on Ben Bulben range.

J. maritimus Lamk. Lesser Sea Rush.—Common on the coast, though rather local. Not recorded from the few miles of shore that constitute the coast of Leitrim.

J. supinus Mœnch. *J. bulbosus* L. Bog Rush.—Divisions all. Common. Calcifuge. To 1520 feet on Maamtrasna. A straggling viviparous form often floats on bog-pools.

var. **fluitans** Lamk.—Recorded from Clare, Gal. W., Mayo W., and Sligo. The prevailing form on the mountains, growing in up to 6 or 8 feet of water, and never flowering.

J. obtusiflorus Ehrh. *J. subnodulosus* Schrank. Blunt-flowered Rush.—Divisions all, but irregularly distributed. Generally distinctly calcicole; but is nevertheless abundant in Gal. W. and Mayo W., and very rare in Rosc., Leit., and Ferm.

J. lamprocarpus Ehrh. *J. articulatus* L. Shining-fruited Rush.—Divisions all. Common.

J. acutiflorus Ehrh. *J. sylvaticus* Reich. Sharp-fruited Rush.—Divisions all. Common.

Luzula vernalis DC. *L. pilosa* Willd. Vernal Wood-Rush.—Local and rare. **Clare**—Parteen. **Gal. SE.**—Woodford; Dalystown; Chevy Chase. **Mayo E.**—Kilmovee. **Ferm.**—frequent on L. Erne; L. Fadd.

L. maxima DC. *L. sylvatica* Gaud. Great Wood-Rush. Ᵹuinneaċ (Prickly).—Divisions all. Calcifuge. Abundant off the limestone in woods, among rocks, &c., ascending to the highest summits.

L. campestris DC. Field Wood-Rush. — Divisions all. Common. To 2680 feet in Mayo.

L. erecta Desv. *L. multiflora* DC. Many-headed Wood-rush.—Divisions all. Frequent. Calcifuge. To 2100 feet on Ben Bulben range. The form *umbellata* is noted from Gal. SE. and Leit.; f. *congesta* from Lim., Gal. SE. and W., Leit.

TYPHACEÆ.

Typha latifolia L. GREAT REED-MACE.—Divisions all. Frequent.

var. **media** Syme.—**Clare**—Inishmaan.

T. angustifolia L. LESSER REED-MACE.—Very rare. **Lim.**—tidal foreshore of Shannon above Limerick, leaves 12 feet long. **Clare**—Dromoland; several lakes about Edenvale; Inchiquin L., and R. Fergus below same.

Sparganium ramosum Curt. *S. erectum* L. BRANCHED BUR-REED.—Divisions all. Common.

var. **microcarpum** Neum.—**Gal. W.**—Maam; Clonbur. **Mayo E.**—Clonbur.

S. simplex Huds. UNBRANCHED BUR-REED.—Divisions all, but not common.

S. affine Schnizl. FLOATING BUR-REED.—Chiefly in lakes among the hills. **Clare**—R. Fergus above Inchiquin L.; S. of Templebannagh L. **Gal. SE.**—Portumna. **Gal. W.**—widespread and frequent. **Mayo E.**—SE. corner of L. Mask. **Mayo W.**—frequent, extending to Inishturk. **Sligo**—L. Ramduff; L. Glendarragh.

S. minimum Fr. SMALL BUR-REED.—Generally in shallow boggy pools. Divisions all, but rare, especially in the north. Rather frequent in Lim., Clare, Gal. W. To 1520 feet on Maamtrasna.

AROIDEÆ.

Arum maculatum L. CUCKOO-PINT.—Divisions all. Frequent. The spotted-leaved form is recorded from Foynes in Lim., and Loughrea, Portumna, and Dunsandle in SE. Gal.

LEMNACEÆ.

Lemna trisulca L. IVY-LEAVED DUCKWEED.—Divisions all, but usually rare and local; frequent in central Clare and Ferm.

L. minor L. COMMON DUCKWEED.—Divisions all. Common.

L. gibba L. GIBBOUS DUCKWEED.—Very rare. **Lim.**—about Limerick. **Ferm.**—L. Erne 3 miles N. of Enniskillen.

L. polyrrhiza L. GREATER DUCKWEED.—Very rare. **Lim.**—Thornfields; L. Gur; frequent about Limerick. **Clare**—1½ mile SW. of Corofin. **Gal. NE.**—Menlo; Lydecan.

ALISMACEÆ.

Alisma Plantago-aquatica L. Great Water-Plantain. — Divisions all. Common.

A. ranunculoides L. Lesser Water-Plantain.—Divisions all. Frequent.

var. **repens** (Davies).—Apparently frequent in mountain districts.

Sagittaria sagittifolia L. Arrow-head. — Local. **Lim.** — Limerick. **Gal. SE.**—Woodford R.; Portumna. **Rosc.**—Drumsna; L. Key; Clooneigh R. **Sligo**—river at Sligo. **Ferm.**—Devenish; Kinarla; Finn R. near Redhill.

With the exception of the Sligo locality, all these stations lie along the Shannon and Erne; and the plant is absent from the rivers and great lakes of Mayo and Galway.

Butomus umbellatus L. Flowering Rush. — Very local. **Lim.**—near the Shannon about Limerick and at Castleconnell. **Clare**—Killaloe; Limerick; about Ennis; common in centre. **Gal. SE.**—Teeneran L. near Gort. **Ferm.**—near Belturbet.

NAIADACEÆ.

Triglochin palustre L. Marsh Arrow-grass.—Divisions all. Common. To 1100 feet on Ben Bulben range.

T. maritimum L. Sea Arrow-grass. — Whole coast-line. Common.

Potamogeton natans L. Floating Pondweed.—Divisions all. Frequent. To 1205 feet on Mweelrea.

P. polygonifolius Pourr. Oblong-leaved Pondweed. Ꝺuılleaɼᵹ na haḃann (River Dulse).—Divisions all. Abundant off the limestone. To 1550 feet on Ben Bulben range.

var. **pseudo-fluitans** Syme. — **Gal. W.** — Ballynahinch. ? Frequent in mountain districts.

P. Kirkii Syme. *P. sparganiifolius* (Læst.) Bab. Man. Ribbon-leaved Pondweed.—**Gal. W.**—in the river at Maam, where it was discovered by Thomas Kirk in 1853. Appears to have been gathered also in Lough Corrib by Dr. D. Moore. Considered by Mr. Fryer to be probably *P. natans* × *polygonifolius*. Its only other known station, Lough Neagh, Co. Antrim, is somewhat doubtful.[1]

P. plantagineus Ducr. *P. coloratus* Hornem. Plantain-leaved Pondweed.—Widespread, but local. Generally calcicole.

---

[1] See R. Ll. Praeger: On some Irish Hawkweed and Pondweed Records. *Irish Nat.*, xviii., 81-85. 1909.

Lim.—L. Gur; Mullough; Thornfields. **Clare**—Fin L.; frequent in centre. **Gal. SE.**—frequent except on the hills. **Gal. W.**—Moycullen; frequent on Bunowen peninsula, very luxuriant. **Gal. NE.**—frequent throughout. **Rosc.**—Mote Park. **Mayo E.**—Ballaghaderreen; L. Carra; Hollymount. **Mayo W.**—Ballina. **Sligo**—Ballysadare; Coolgagh L.; Lissadill.

P. rufescens Schrad. *P. alpinus* Balb. REDDISH PONDWEED.—Not common. **Lim.**—near Limerick. **Clare**—L. Senan. **Gal. W.**—Kylemore L.; near Galway. **Mayo W.**—Newport; W. of Castlebar. **Ferm.**—Carrick L.; stream out of Doagh L.

P. lanceolatus Smith. LANCEOLATE-LEAVED PONDWEED.—Very rare. **Clare**—Cahir River south of Blackhead.[1]

var. **hibernicus** Ar. Benn.—**Gal. NE.**—Grange R. at Barbersfort; river at Clonbrock.[2] This is a large form, for which Mr. Bennett has suggested a distinctive name; both it and the type grow in shallow stony rippling streams on limestone.

A very rare plant, unknown in Ireland outside our district, and in Great Britain occurring in Anglesey and Cambridgeshire only.

P. heterophyllus Schreb. VARIOUS-LEAVED PONDWEED.—Divisions all; widely but sparingly distributed.

f. **confertus.**—**Mayo E.**—near Moore Hall, L. Carra.

var. **graminifolius** Fr.—Where the plant grows in flowing water, it usually occurs in this form.

P. nitens Weber. BRIGHT-LEAVED PONDWEED.—Rather rare. **Lim.**—Shannon at Castleconnell. **Clare**—Ballyportry L.; Shannon at Doonass. **Gal. W.**—Ross L.; Ballycuirke L.; Maumeen L.; Doon L. **Gal. NE.**—Grange R. near Tuam. **Mayo E.**—L. Carra and stream out of it. **Mayo W.**—L. Conn; Kill L. and Sruhillbeg L. on Achill. **Sligo**—Ballysadare. **Leit.**—L. Bofin. **Ferm.**—Lower L. Macnean.

P. lucens L. SHINING PONDWEED.—Divisions all *except Gal. W., Rosc.*, but not abundant.

P. lucens × prælongus. *P. Babingtonii* Ar. Benn. *P. longifolius* Bab. *non* Gay.—A single specimen which Mr. Bennett considers to belong to this hybrid was found floating in L. Corrib by John Ball in 1835.[3]

P. decipiens Nolte.—**Clare**—Killone L. near Ennis.

---

[1] H. C. LEVINGE, *Journ. Bot.*, xxix., 344. 1891.

[2] R. LL. PRAEGER, *Irish Nat.*, v., 243. 1896; and ix., 141. 1900.

[3] See A. BENNETT in *Journ. Bot.*, xxxii., 204-5. 1894.

P. **Zizii** Koch. *P. angustifolius* Bercht. & Presl.—Rather rare. **Lim.**—near Askeaton. **Clare**—Coolarta L.; L. Senan. **Gal. W.**—Cong; L. Corrib near Maam; Ballycuirke L.; Aillebrack L. **Gal. NE.**—frequent in R. Suck. **Rosc.**—R. Suck; L. Ree. **Mayo E.**—about Cong. **Mayo W.**—Westport; two lakes on Mullet. **Sligo**—river at Sligo; L. Gill. **Leit.**—L. Melvin; Glenade L.; R. Drowse. **Ferm.**—Kesh River mouth; Carrick.

P. **prælongus** Wulf. Long Pondweed.—Rare. **Lim.**—Castleconnell; Plassy. **Clare**—Coolarta L. **Gal. W.**—Ballynahinch; L. Mask; L. Corrib. **Mayo E.**—SE. corner of L. Mask; two lakes E. of Foxford. **Mayo W.**—L. Cullin. **Leit.**—Carrickaport L.

P. **perfoliatus** L. Perfoliate Pondweed.—Divisions all. Frequent.

var. **macrophyllus** Blytt.—**Gal. W.**—Maumeen L.

P. **crispus** L. Curled Pondweed.—Divisions all. Frequent.

P. **densus** L. Opposite-leaved Pondweed.—Southern end of the Shannon only. **Lim.**—frequent in north. **Clare**—Killaloe, and at Limerick on tidal foreshore of Shannon. Elsewhere in Ireland rather widely spread in the southern half of the island.

P. **obtusifolius** Mert. & Koch. Blunt-leaved Pondweed.—Local and rare. Calcifuge. **Lim.**—L. Gur. **Clare**—Ballylean L.; Farrihy L. **Gal. SE.**—Rossmore. **Mayo W.**—Rathroeen L. **Sligo**—Feenagh L.

P. **Friesii** Rupr. *P. mucronatus* Schrad. Flat-stemmed Pondweed.—Rare. **Lim.**—near Foynes. **Gal. SE.**—L. Derg near Portumna. **Gal. W.**—Roundstone. **Mayo E.**—Claremorris L.

P. **pusillus** L. Small Pondweed.—Divisions all. Frequent.

P. **pectinatus** L. Fennel-leaved Pondweed.—Local. **Lim.**—Foynes; Limerick. **Clare**—Killaloe; Mount Shannon. **Gal. SE.**—Kilcolgan estuary. **Gal. W.**—Inishbofin. **Gal. NE.**—pools E. of Galway. **Mayo W.**—Achill; Mullet; Inishkea. **Ferm.**—Carrick L.

P. **flabellatus** Bab. *P. interruptus* Kit. Fan-like Pondweed.—Rare. **Clare**—R. Fergus at Ennis. **Rosc.**—R. Shannon at Athlone. **Mayo W.**—Mullet (or *P. vaginatus*). **Sligo**—Glencar L.; Ballysadare.

var. **scoparius** Fryer.—**Lim.**—Curragh Chase.

P. **filiformis** Nolte. Slender Pondweed.—Rare. Northern half of the district, generally on sand in shallow water in low-level lakes. **Gal. W.**—SW. end of L. Mask. **Rosc.**—frequent in L. Ree. **Mayo E.**—L. Cullin at outlet; frequent in L. Carra. **Mayo W.**—Cross L. on Mullet; plentiful in Keel L. and Sruhillbeg L. on Achill I.; L. Cullin near Pontoon and at outlet; N. end of L. Mask. **Leit.**—Annaghearly L.; L. Melvin. **Ferm.**—L. Melvin at Garrison; between Kinnausy I. and Kesh on Lower L. Erne.

Ruppia rostellata Koch. TASSEL PONDWEED.—Rather rare. **Lim.**—Foynes. **Clare**—Lehinch; Kilrush; Fergus islands. **Gal. SE.**—Kilcolgan; Oranmore. **Gal. W.**—Ballyconneely; near Barna. **Gal. NE.**—Ballyloughaun. **Mayo W.**—Mullet; E. side of Achill; Newport. **Sligo**—Ballysadare on tidal mud-flats.

Zannichellia palustris L. HORNED PONDWEED. — Shallow water. Rare. **Lim.**—about Foynes; Rinekirk. **Clare**—Canon I.; Inishmore; Slieve Elva (*Z. brachystemon* Gay); Cahir River. **Rosc.**—near Kiltoom on L. Ree. **Mayo E.**—Cong.

Zostera marina L. GRASS-WRACK.—Muddy estuaries and bays. Common along the coast, *Leit.* being the only maritime division from which it is not recorded.

var. **angustifolia** Hornem.—**Lim.**—Robertstown creek. **Gal. SE.**—Kinvarra. **Gal. W.**—Gentian Hill. **Mayo W.**—near Killala. Probably frequent.

Z. nana Roth. DWARF GRASS-WRACK.—Muddy bays. **Gal. W.**—Gentian Hill.

Naias flexilis Rostk. & Schmidt. SLENDER NAIAD.—**Gal. W.**—in fair quantity in Cregduff L., ¾ mile west of Roundstone. This is a small rather deep lake, peaty, with rocky points, and blocks of rock dropping down steeply, among which the little Naiad grows in several feet of water (see plate 12). Elsewhere in Ireland confined to L. Caragh, Glencar L., and the lower Lake of Killarney, all in Kerry. In Great Britain found only in Perthshire, Colonsay, and (?) Skye.

First found by Daniel Oliver in 1850, at Roundstone.

ERIOCAULONEÆ.

Eriocaulon septangulare With. PIPEWORT.—Lakes and bog-pools. Very local. **Clare**—Monmor Lough, and pools in Sragh bog near Doonbeg. **Gal. W.**—frequent throughout, from L. Corrib and L. Mask to the extreme west. See plate 6. **Gal. NE.**—wet bog near Killower L. **Mayo W.**—south half, locally frequent; Ardmore L. on Mullet; frequent on Achill.

This plant ranges up the west coast of Ireland from W. Cork to Donegal, avoiding the limestone tracts. The

Gal. NE. station is the only one inside the limestone area, and is also unusually far inland, being 18 miles from the head of Galway Bay. In Great Britain confined to a few of the Hebridean islands. This is a N. American species, not found on the European continent. Often very abundant where it occurs, covering the bottom in shallow water. It is extremely buoyant, and in rough weather breaks away from its anchorage, and is often washed up in great quantity, when its curious soft white jointed worm-like roots form a conspicuous feature. The flower-stem (July–Sept.) varies in length from a couple of inches, when growing on bare wet ground, to over three feet when the plant grows in deep water. To 300 feet in Galway, but probably ranges higher.

CYPERACEÆ.

Eleocharis acicularis R. & S. Least Spike-rush.—Edges of lakes and rivers. Rather rare. **Lim.**—canal at Limerick. **Clare**—Inchiquin L.; Shekamore L.; Dromore Castle; L. Atedaun. **Gal. SE.**—L. Derg near Portumna; Rossmore. **Rosc.**—L. Ree near Clooneigh R. **Ferm.**—Knockninny; frequent on Lower L. Erne.

E. palustris R. & S. Creeping Spike-rush.—Divisions all. Common. To 1205 feet on Mweelrea.

E. uniglumis Schultes. Link's Spike-rush.—Marshes near the sea. Rare. **Lim.**—Limerick. **Mayo W.**—Newport.

E. multicaulis Smith. Many-stalked Spike-rush.—Chiefly in wet bogs. Frequent. Divisions all *except Lim.*, *Rosc.* Chiefly off the limestone. Common in Gal. W. and Mayo W. only.

Scirpus pauciflorus Lightf. Few-flowered Spike-rush.—Wet ground. Divisions all. Frequent. Chiefly on the limestone.

S. cæspitosus L. Scaly Spike-rush.—Divisions all. Common off the limestone, especially on the hills. From sea-level in Connemara to 2100 feet on Ben Bulben range.

S. fluitans L. Floating Spike-rush.—Divisions all *except Ferm.* Generally frequent off the limestone.

S. Savii S. & M. *S. cernuus* Vahl. *S. filiformis* Savi. Savi's Spike-rush.—Local, and usually near the sea. **Lim.**—Foynes. **Clare**—Doonbeg; Rehy Hill; Inishmore. **Gal. SE.**—Kilcolgan. **Gal. W.** and **Mayo W.**—frequent. **Sligo**—Dromore West; Mullaghmore.

var. **pygmæus** (Kunth).—**Mayo W.**—Mallaranny; Newport.

S. setaceus L. Bristle-leaved Spike-rush.—Divisions all. Frequent.

S. lacustris L. Bullrush. boᵹ ṡeiṁin (Soft Rush)—Divisions all. Common.

S. Tabernæmontani Gmel. Glaucous Bullrush.—Frequent along the coast-line, where pools or salt-marshes occur.

S. triqueter L. Three-edged Bullrush.—Upper end of Shannon estuary only. **Lim.** and **Clare**—abundant on the muddy foreshore on both sides of the Shannon from Limerick down for about five miles, as far as Tervoe lower light; and sparingly in Cratloe Creek on the Clare side.[1] See plate 7. A rare plant, unknown elsewhere in Ireland, and in Great Britain confined to the estuaries of the Thames, Arun, and Tamar, in southern England.

S. maritimus L. Sea Club-rush.—Common along the whole coast-line, and up the rivers to the verge of tidal influence.

S. sylvaticus L. Wood Club-rush.—Local and rare. **Lim.** —Newbridge; Plassy. **Clare** — Parteen. **Ferm.** — near Enniskillen; above Correl Glen.

S. rufus Schrad. *Blysmus rufus* Panz. Brown Club-rush.—Rare. **Gal. W.**—Custrower Bay (an old record not verified). **Mayo W.**—Mullet; Killala; Rosserk Abbey. **Sligo**—Ballysadare; Drumcliff River.

Eriophorum vaginatum L. Hare's-tail Cotton-grass.—Divisions all. Frequent. To 2100 feet in Sligo, and 2680 feet in Mayo.

E. angustifolium Roth. Narrow-leaved Cotton-grass. bláṫ portaiċ (Bog Bloom); Cannaḃan móna (White-head of the Bog).—Divisions all. Common. To 2100 feet on Ben Bulben range; 2350 feet on Mweelrea.

E. latifolium Hoppe. Broad-leaved Cotton-grass.—Very rare. **Gal. SE.**—Woodlawn. **Gal. W.**—NW. side of Urrisbeg. **Ferm.**—three stations near Carrick Lake.

Rhynchospora fusca Ait. Brown Beak-rush.—Divisions all. **Lim.**—Castleconnell bog. **Clare**—Monmor and Doonbeg bogs. **Gal. SE.**—by L. Derg below Woodford. **Gal. W.**—frequent. **Gal. NE.**—Clonbrock; frequent in Tuam district. **Rosc.**—east of Slieve Bane; Kilteevan; Athlone. **Mayo E.**—frequent in W. half. **Mayo W.**—Nephin; west of Castlebar; Foxford. **Sligo**—behind Cliffony. **Leit.**—Uragh L. near Kinlough; Drumod; Rinn L. **Ferm.**—near Florencecourt. A characteristic plant of the W. half of Ireland, its favourite habitat being shallow Sphagnum-filled pools on the surface of low-level peat-bogs.

---

[1] See *Irish Nat.*, ix., 262–263. 1900.

R. alba Vahl. White Beak-rush.—Divisions all. Frequent, especially on low-level peat-bogs.

Schœnus nigricans L. Black Bog-rush.—Divisions all. Frequent. To 1350 feet on Mweelrea.

Cladium Mariscus Br. *C. germanicum* Schrad. *C. jamaicense* Crantz. Twig-rush. Colgróc.—Divisions all. Unevenly distributed; common or frequent in N. Lim., Clare, Gal. SE. and W., Rosc., Mayo W.; local or rare in Gal. NE., Mayo E., Sligo, Leit., Ferm.

Carex dioica L. Diœcious Sedge.—Rather rare. **Clare**—Ballyogan L.; near Crusheen. **Gal. W.**—Clonbur. **Mayo E.**—Glendaduff; NW. of Claremorris. **Mayo W.**—widespread but rare. **Sligo**—Ballysadare; Glencar; Truskmore. **Ferm.**—frequent in Carrick district. To 1650 feet in Ben Bulben district.

C. pulicaris L. Flea Sedge.—Divisions all. Common. To 2000 feet in Mayo.

C. disticha Huds. Soft Sedge.—Divisions all. Frequent.

C. arenaria L. Sea Sedge.—Common wherever sandy coasts occur. Divisions all *except Lim., Gal. SE., Rosc., Mayo E., Ferm.*

C. teretiuscula Good. *C. diandra* Schrank. Lesser Panicled Sedge.—Wet lowland bogs. Divisions all, but frequent in Sligo only.

var. **Ehrhartiana** (Hoppe).—**Gal. NE.**—near Clonbrock.

C. paradoxa Willd. Paradoxical Sedge.—**Clare**—marshy S. shore of lake at Dromoland. Elsewhere in Ireland known only from Westmeath.

C. paniculata L. Panicled Sedge.—Divisions all. Usually frequent, but rare in Gal. NE. and Sligo.

C. vulpina L. Great Sedge.—Divisions all *except Rosc., Mayo E.* Rare in Ferm. Rather frequent elsewhere, especially near the sea.

C. contigua Hoppe. *C. muricata* auct. angl. Greater Prickly Sedge.—Hedgebanks and pastures. Rare. **Lim.**—Limerick. **Clare**—Ardsollus R.; Knockatien near Ballyvaughan. **Gal. W.**—Oughterard. **Sligo**—Rosses Point.

C. divulsa Stokes. Grey Sedge.—Hedgebanks. Very rare. **Lim.**—Limerick; Ringmoylan; Adare; frequent in Shanid barony. **Clare**—Coney I. and Feenish in R. Fergus. **Gal. SE.**—Garryland.

C. echinata Murr. *C. stellulata* Good. Lesser Prickly Sedge.—Divisions all. Common.

C. remota L. Distant-spiked Sedge.—Divisions all. Frequent.

C. remota × vulpina. *C. axillaris* Good. Axillary

SEDGE.—**Rosc.**—damp roadside hedgebank between Grange and L. Elia.

C. elongata L. ELONGATED SEDGE.—**Ferm.**—marsh between Crum Castle and the farmyard, Upper L. Erne. A very rare plant in Ireland, being now extinct in its only other station (Lough Neagh).

C. curta Good. WHITE SEDGE.—Not common. **Lim.**—Castleconnell bog. **Clare**—Lisdoonvarna. **Gal. W.**—between Maam and L. Corrib. **Gal. NE.**—near Tuam. **Rosc.**—L. Arrow. **Sligo**—Feenagh L. **Leit.**—Ballinamore. **Ferm.**—E. of Enniskillen; L. Anlaban; near Crum Castle.

C. ovalis Good. *C. leporina* L. OVAL-SPIKED SEDGE.—Divisions all. Frequent. Generally off the limestone, and on hilly ground.

C. Hudsonii Ar. Benn. *C. elata* All. *C. stricta* Good. GREATER TUFTED SEDGE.—Lake margins chiefly. Divisions all, being frequent in central Clare, Gal. SE. and W., Leit., Ferm.

C. gracilis Curt. *C. acuta* auct. SLENDER-SPIKED SEDGE.—Sides of rivers and lakes. Rather rare.—**Lim.**—Curragh chase; Hermitage; Adare. **Gal. SE.**—not rare along the Shannon. **Gal. NE.**—Donamon. **Sligo**—L. Key. **Ferm.**—Enniskillen.

C. trinervis Degl. THREE-NERVED SEDGE.—**Gal. W.**—damp part of a seaside field near Roundstone. So far not recognized elsewhere in Ireland.

C. rigida Good. STIFF MOUNTAIN SEDGE.—Boggy mountains. Usually a summit plant. **Gal. W.**—Benwee; Benchoona. **Mayo W.**—frequent on the higher mountains, 1600–2600 feet. **Sligo**—Ben Bulben; Truskmore; 1700–2100 feet.

C. aquatilis Wahl. WATER SEDGE.—Margins of lakes and rivers. Sea-level to 160 feet. **Lim.**—near Corbally. **Gal. W.**—by the Maam River. **Rosc.**—south end of L. Allen. The Limerick plant is var. *virescens* Anders.; the others var. *elatior* Bab. (*Watsoni* Syme).

C. vulgaris Fr. *C. Goodenowii* Gay. LESSER TUFTED SEDGE.—Divisions all. Common. To 2000 feet in Galway.

var. **juncella** Fr.—**Gal. SE.**—Woodford. **Gal. W.**—Lisoughter near Recess. **Gal. NE.**—Donamon. **Mayo E.**—swamp opposite Ashford, Cong.

C. glauca Scop. *C. flacca* Schreb. GLAUCOUS HEATH SEDGE.—Divisions all. Common. Remarkably luxuriant in crevices in the limestone pavements, growing 3–4 feet high. To 2000 feet on Ben Bulben range; 1900 feet on Maam Turk.

var. **stictocarpa** (Smith).—**Sligo**—north face of Ben Bulben.

C. limosa L. Drooping Bog Sedge.—Wet bogs. Local. Divisions all *except Rosc., Leit.* Frequent in Gal. W. and Mayo W. One station only in Gal. NE., Mayo E.

C. pilulifera L. Round-headed Sedge.—Heaths. Divisions all. Frequent. To 2680 feet in Mayo.

C. præcox Jacq. *C. caryophyllea* Latourr. *C. verna* Chaix. Vernal Sedge.—Divisions all. Common.

C. pallescens L. Pale Sedge. — Moist places. Frequent. Divisions all *except Gal. NE.* Frequent in Clare and Ferm. Rare in Lim., Sligo, Leit.

C. panicea L. Pink Sedge.—Divisions all. Common. To 2400 feet in Mayo; 1700 feet on Ben Bulben range.

C. pendula Huds. Great Pendulous Sedge. — Woods and glens. Rather rare. **Lim.** — Doon; Adare. **Clare** — Lisdoonvarna; Inishcaltra. **Gal. SE.**—Chevy Chase. **Mayo E.**—†Ashford. **Sligo**—Hazelwood; Doonally; Drumcliff. **Leit.**—above Glencar L.; Glenade. **Ferm.**—Florencecourt; Marble Arch.

C. strigosa Huds. Loose-flowered Sedge.—Very rare. **Lim.**—frequent in Foynes district. **Rosc.**—Kilteevan. **Mayo E.**—Shangorman I. in L. Mask. **Sligo**—roadside at W. end of Glencar L. **Ferm.**—Florencecourt woods.

C. sylvatica Huds. Wood Sedge. — Divisions all. Common. To 1850 feet on Ben Bulben range.

C. lævigata Smith. *C. helodes* Link. Smooth Sedge.—Divisions all *except Gal. NE. and Rosc.* Widespread but not common.

C. binervis Smith. Green-ribbed Sedge.—Divisions all. Common off the limestone. Ascends to the highest summits.

C. distans L. Distant-spiked Sedge.—Frequent along the whole coast-line. Also inland in three stations:—**Gal. NE.**—Barbersfort; by Clare R. below Weir Bridge north of Tuam. **Ferm.**—Cleenishgarve on Lower L. Erne.

C. Hornschuchiana Hoppe. *C. fulva* Host. Tawny Sedge.—Divisions all. Frequent. To 1000 feet in Mayo.

C. extensa Good. Bracteated Sea Sedge.—Salt marshes and sea-rocks. **Lim.**—Foynes. **Clare**—Fergus estuary; Lehinch; Inishmore. **Gal. SE.**—Kilcolgan estuary. **Gal. W.**—frequent. **Gal. NE.**—Rinmore. **Mayo W.**—frequent. **Sligo**—Drumcliff. Also occurs inland by L. Corrib below Oughterard.

var. **pumila** Anders.—**Mayo W.**—Mallaranny.

C. flava L. Yellow Sedge.—Divisions all. Common. To 2050 feet in Mayo, and 1850 feet on Ben Bulben range.

var. **elatior** Shlec.—**Mayo W.**—frequent in Mallaranny district.

var. **Œderi** (Retz).—**Lim.**—near Limerick. **Gal. W.** and **Mayo E.**—Clonbur. **Mayo W.**—frequent in Mallaranny district.

var. **minor** Towns.—**Gal. NE.**—Killower L. **Mayo W.**—common in Mallaranny district.

var. **cyperoides** Marss.—**Gal. W.**—NW. shore of L. Corrib; S. shore of L. Mask. **Mayo E.**—S. shore of L. Mask.

C. flava × Hornschuchiana. *C. xanthocarpa* Degl.—**Lim.**—Foynes; Ahacronane R.; near Castleconnell. **Gal. W.**—Dog's Bay; Ross L.; NW. side of L. Corrib; N. of Maam. **Mayo E.**—S. shore of L. Mask. **Mayo W.**—Newport; W. of Castlebar. **Sligo**—L. Gill near Doonee Rock.

C. filiformis L. *C. lasiocarpa* Ehrh. SLENDER-LEAVED SEDGE.—Bogs and marshes. Local. **Clare**—Monmor bog; common in centre and in Fergus district. **Gal. SE.**, **W.** and **NE.**—frequent. **Rosc.**—Rockville; Corkip L.; Athlone; L. Key. **Mayo E.**—near Cong; L. Carra; Hollymount. **Mayo W.**—Keel L. on Achill; Birreencorragh; Crumpaun R.; Erriff R. **Ferm.**—W. of Ballyshannon; frequent in Carrick district. Increases westward in Ireland.

C. hirta L. HAIRY SEDGE.—Divisions all. Frequent.

C. Pseudo-Cyperus L. CYPERUS-LIKE SEDGE.—Wet places. Local. **Lim.**—Curragh Chase; Gardenhill; Plassy. **Clare**—Inishcaltra; frequent in south and centre. **Gal. SE.**—Rinmaher on L. Derg; Portumna. **Gal. W.**—between Galway and Moycullen; Bunowen. **Gal. NE.**—Menlo Castle. **Rosc.**—near Ballybay. **Leit.**—Rinn L.

C. paludosa Good. *C. acutiformis* Ehrh. LESSER BANK SEDGE.—Marshy places. Local. Divisions all *except Gal. W. and NE., Mayo E. and W.* A characteristic Central Plain species, absent from the hill districts. Frequent in Gal. SE. only.

C. riparia Curtis. GREATER BANK SEDGE.—Marshes and river-margins. Local. **Lim.**—frequent in north. **Clare**—Ennis; Dromoland; Ballycar. **Gal. SE.**—Loughrea. **Gal. NE.**—L. Corrib S. of Headford and at Keekil. **Mayo W.**—Killala. **Sligo**—near Knocknarea.

C. ampullacea Good. *C. inflata* Huds. *C. rostrata* Stokes. BOTTLE SEDGE.—Divisions all. Common. To 1400 feet on Ben Bulben range; 1520 feet on Maamtrasna.

var. **latifolia** Aschers.—**Gal. W.** and **Mayo E.**—near Cong.

C. vesicaria L. BLADDER SEDGE.—Divisions all, but not generally common. More frequent in central Clare and E. Mayo than elsewhere.

GRAMINEÆ.

§**Panicum capillare** L.—**Lim.**—casual at Limerick.

Phalaris arundinacea L. REED-GRASS.—Divisions all. Common.

§**P. canariensis** L. CANARY GRASS.—**Lim.**—Foynes; Mount Trenchard. **Sligo** — Strandhill; Rosses. **Ferm.** — near Enniskillen.

Anthoxanthum odoratum L. VERNAL GRASS.—Divisions all. Common. To 2680 feet in Mayo.

Alopecurus geniculatus L. FLOATING FOX-TAIL.—Divisions all. Frequent.

A. pratensis L. FOX-TAIL.—Divisions all, but not common.

§**A. agrestis** L. *A. myosuroides* Huds.—**Gal. SE.**—casual at Castle Taylor.

Milium effusum L. MILLET-GRASS.—Rocky woods. Rare. **Lim.** — Mount Trenchard; near Tarbert. **Gal. SE.** — Dalystown. **Gal. W.**—NW. of Oughterard. **Mayo E.**—S. of Claremorris. **Mayo W.**—L. Cullin; L. Conn. **Sligo** —near Sligo; Doonee Rock and Rockwood on L. Gill.

Phleum pratense L. TIMOTHY-GRASS.—Divisions all, but unevenly distributed. Common in Leit., Ferm.

P. arenarium L. SEA CAT'S-TAIL GRASS.—Sandy sea-shores. Rare. **Clare**—Lehinch; Inishmore. **Mayo W.**—Mullet; Mallaranny. **Sligo**—Raghly; Rosses Point; Strandhill; Cliffony.

Agrostis canina L. BROWN BENT.—Divisions all *except Gal. SE., Rosc.* Probably frequent throughout.

A. alba L. FIORIN; MARSH BENT.—Divisions all. Common.

var. **stolonifera** L.—Recorded from Gal. SE. and NE. Probably common.

var. **coarctata** (Hoffm.).—**Mayo E.**—abundant on islands in L. Carra.

A. vulgaris With. *A. tenuis* Sibth. FINE-LEAVED BENT.—Divisions all. Very common. To 2680 feet in Mayo.

var. **pumila** (L.)—Recorded from Lim., Gal. W., Mayo E. and W., Leit., Ferm. Merely a starved state.

§**Polypogon monspeliensis** Desf. ANNUAL BEARD-GRASS.—**Lim.** —casual at Limerick.

Calamagrostis epigeios Roth. WOOD REED.—Rocky places. **Clare**—Ballyvaughan; frequent on Inishmore. **Gal. W.**— near the harbour on Inishbofin. Elsewhere in Ireland found only in Co. Londonderry.

Psamma arenaria R. & S. *Ammophila arenaria* Link. MARRAM; BENT; SEA MAT GRASS. — Common on sandy shores wherever they occur. In peaty soil on cliff-edges, 70-150 feet above the sea, at Dooega Head, Achill I.

Aira caryophyllea L. SILVERY HAIR-GRASS.—Divisions all. Frequent.

A. præcox L. EARLY HAIR-GRASS.—Divisions all. Frequent.

Deschampsia cæspitosa Beauv. *Aira cæspitosa* L. TUFTED HAIR-GRASS.—Divisions all. Common. To 2680 feet in Mayo.

var. **brevifolia** Parnell.—**Mayo W.**—Inishturk.

D. alpina R. & S. *Aira alpina* L. ALPINE HAIR-GRASS.—Very rare, and in need of confirmation. **Mayo W.**—Mweelrea; Bengorm; 2100–2500 feet.

D. discolor R. & S. *Aira uliginosa* Weihe. *A. setacea* Richter. MARSH HAIR-GRASS.—Wet bogs. **Gal. W.**—frequent over a large area of bog from Kilkieran to Clifden. Not found elsewhere in Ireland.

D. flexuosa Trin. *Aira flexuosa* L. WAVED HAIR-GRASS.—Divisions all *except Gal. NE.* Calcifuge. Common on the non-calcareous hill-ranges, ascending to the highest summits.

Holcus mollis L. CREEPING SOFT-GRASS.—Divisions all. Frequent.

H. lanatus L. MEADOW SOFT-GRASS.—Divisions all. Common. To 1325 feet in Mayo.

Trisetum flavescens Beauv. *Avena flavescens* L.—YELLOW OAT-GRASS.—Divisions all. Often abundant on the limestone. Rare on other rocks. Decreases northward.

Avena pubescens Huds. DOWNY OAT-GRASS.—Divisions all *except Mayo W.* Calcicole like the last. Common throughout Rosc., but generally local, following the limestone. To 1500 feet in Sligo.

§**A. fatua** L. WILD OAT.—**Gal. W.**—Inishbofin and Inishark.

§**A. strigosa** Schreb. BLACK OAT.—**Clare**—Inishmore. **Gal. SE.**—Loughrea. **Mayo E.**—Hollymount.

Arrhenatherum avenaceum Beauv. *A. elatius* M. & K. TALL OAT-GRASS.—Divisions all. Common.

var. **nodosum** Reichb.—**Lim.**—Thornfields.

Triodia decumbens Beauv. *Sieglingia decumbens* Bernh. HEATH-GRASS.—Divisions all. Frequent. To 1150 feet on Twelve Bens.

Phragmites communis Trin. *Arundo Phragmites* L. REED. Ȝiolcaċ.—Divisions all. Common. Starved colonies occur sometimes in large bogs, no doubt a relic of former lakes, now overwhelmed by peat.

Sesleria cærulea Arduin. BLUE MOOR-GRASS.—**Clare**—

abundant throughout Burren and Aran, 0–1000 feet, extending down the central limestone tract to Ennis and Newmarket. **Gal. SE.**—abundant in W. half, and on shores and islands of L. Derg. **Gal. W.**—abundant on the limestone in E.; on sand-dunes and rocky heaths at Dog's Bay and Bunowen peninsula. **Gal. NE.**—common in W. and SW. **Mayo E.**—S. and N. ends of L. Mask; abundant round L. Carra. **Mayo W.**—Ballina; sandhills at Killala. **Sligo**—Ballysadare; Knocknarea; Doonee Rock; Ben Bulben; to 1100 feet. **Leit.**—L. Gill; Glencar; common in Glenade. **Ferm.**—common in Carrick district.

The most abundant and characteristic grass of the western limestones, occurring wherever bare limestone appears save in Lim.; it apparently does not cross the Shannon in the south. Confined in Ireland to our district, save where it colonizes the east bank of the Shannon in Tipperary and Westmeath, and the northern extremity of the limestone in south Donegal. From the limestone rocks it extends to esker-ridges, dry pastures, and sand-dunes; and in the extreme SW. of Connemara to rocky heaths where no trace of limy soil is evident. In Ferm., also, it grows on ledges of Yoredale sandstone. Occurs abundantly at sea-level, and thence up to 1000 feet in Clare and 1100 feet on Ben Bulben range.

var. **luteoalba** Opiz.—**Clare**—Ballyvaughan. **Gal. SE.**—Castle Taylor. **Gal. NE.**—near Galway. Apparently frequent.

Cynosurus cristatus L. DOG'S-TAIL GRASS.—Divisions all. Common.

§**C. echinatus** L. ROUGH DOG'S-TAIL GRASS.—**Lim.**—casual at Limerick.

Kœleria gracilis Pers. var. **britannica** Domin. *K. cristata* auct. angl. CRESTED HAIR-GRASS.—Divisions all, rather local.

Molinia cærulea Mœnch. *M. varia* Schrank. PURPLE MOOR-GRASS.—Divisions all. Locally abundant. To 2000 feet on Twelve Bens.

var. **depauperata** (Lindl.).—**Gal. W.**—common on bogs in Connemara.

Catabrosa aquatica Beauv. WATER WHORL-GRASS.—Divisions all, locally distributed.

var. **littoralis** Parnell.—Wet sea-sands. **Gal. W.**—two miles W. of Roundstone; Doonloughan Bay. **Mayo W.**—sands W. of Belmullet.

Melica uniflora Retz. *M. nutans* L. WOOD MELICK-GRASS.—

Shady places. Divisions all *except Mayo W.* Widespread but not common.

Dactylis glomerata L. COCK'S-FOOT GRASS.—Divisions all. Common.

Briza media L. QUAKING-GRASS.—Divisions all. Frequent; often abundant on limestone.

Poa annua L. ANNUAL MEADOW-GRASS. — Divisions all. Common. To 2510 feet on Croaghpatrick.

P. alpina L. MOUNTAIN MEADOW-GRASS.—**Sligo**—summit of Ben Bulben; Annacoona; 1500-1950 feet. Elsewhere in Ireland found only on the summit of Brandon in Kerry.

P. nemoralis L. WOOD MEADOW-GRASS. — Shady places. Very rare. **Lim.**—Adare. **Clare**—Ballyvalley near Killaloe. **Gal. W.**—wood at Ballynahinch.

‡**P. compressa** L. FLAT-STEMMED MEADOW-GRASS.—Dry places. Very rare, probably not native. **Lim.**—dock wall at Limerick. **Gal. NE.**—walls and dry banks between Galway and Tuam (an old record needing verification). **Mayo W.** —railway at Ballina.

P. pratensis L. SMOOTH MEADOW-GRASS.—Divisions all. Common.

var. **sub-cærulea** (Sm.).—**Mayo W.**—Mallaranny.

var. **strigosa** (Gaud.).—**Clare**—wall tops at Parteen.

P. trivialis Link. ROUGH MEADOW-GRASS.—Divisions all. Common.

var. **Koeleri** (DC.).—**Mayo W.**—Mallaranny. **Leit.**—Glenade.

Glyceria fluitans Br. FLOATING-GRASS.—Divisions all. Common.

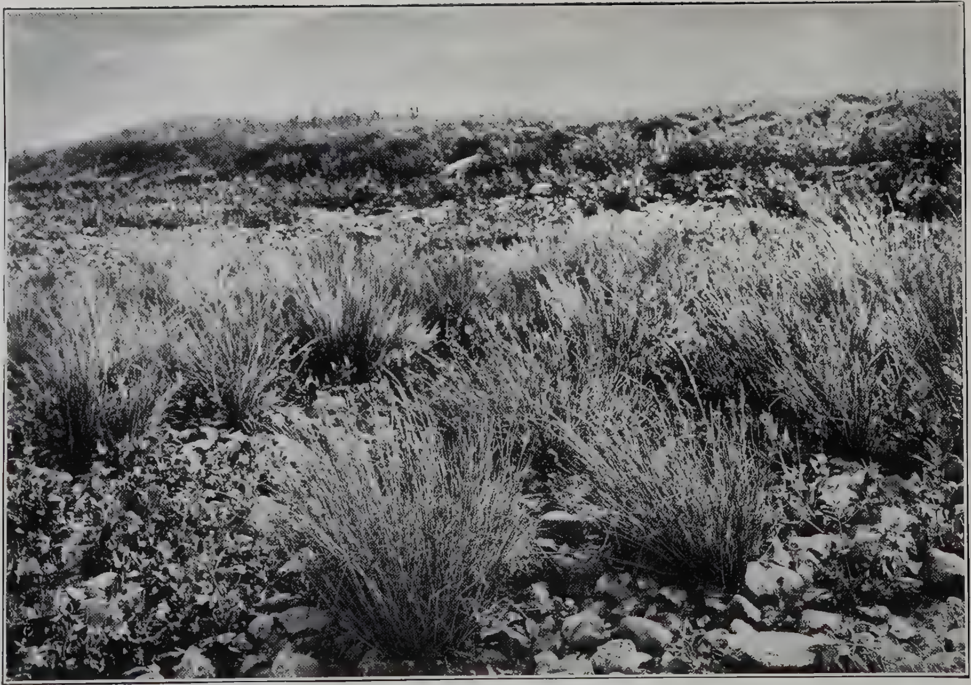
G. plicata Fr. FOLDED-LEAVED MEADOW-GRASS.—Divisions all *except Rosc.* Probably frequent throughout.

G. aquatica Wahlb. REED MEADOW-GRASS. — Pools and streams. Rare. **Lim.**—Cahirmoyle; Corbally. **Gal. SE.** —Portumna. **Rosc.**—west of Athlone; occasionally about L. Ree. **Mayo W.**—‡W. end of L. Nambrack, Achill I.

A widespread Central Plain plant, rare in north and south, and not coming west of the Shannon save for the suspicious Achill station.

G. maritima M. & K. *Schlerochloa maritima* Lindl. SEA MEADOW-GRASS.—Muddy sea-shores. Generally common, but not yet recorded from *Leit.*

G. festucæformis Heinh.—Stony sea-shores in estuaries. Shannon only. **Lim.**—on Trummera Big, an islet off



GLYCERIA FESTUCÆFORMIS ON ISLET NEAR FOYNES, CO. LIMERICK.

Trummera Big, July, 1908. Forms large upright tufts at and below high water mark, along the lower margin of a thick fringe of Atriplex. August, 1908.

R. Welch, Photo.

To face p. 300

Foynes.[1] **Clare**—Sand I., Blackthorn I., Berger I., Rat I., all in the Fergus estuary.[2]

A Mediterranean species, elsewhere in the British Isles known only in Co. Down, in NE. Ireland, where, as on the Shannon, its head-quarters are small islets with stony shores, on which it forms a fringe at or slightly below high-water mark, and lower down than the plants (*Aster Tripolium*, Atriplex spp., &c.) which accompany it. It is very distinct when growing, and easily recognized at a distance by its large, erect tufts, two feet or more in height.

G. Foucaudi Hackel *in litt.*—**Lim.**—abundant on soft mud at Robertstown Creek and Aughinish.[3] **Clare**—Deer I., Inishmacnaughton, Ing Point, all in Fergus estuary.[2] A grass allied to *G. maritima* and *G. festucæformis*, inhabiting muddy flats between ordinary and spring-tide high-water mark, where its long procumbent stems form a thick mat. Only Irish stations. In England found only in Kent and Hants, and, on the Continent, along the lower reaches of the Charente in W. France.

Festuca rigida Kunth. *Schlerochloa rigida* Link. *Poa rigida* L. HARD FESCUE.—Divisions all *except Ferm.* Calcicole. Common in Gal. SE. and NE., Rosc. Frequent in Lim. and Clare. Rare in Gal. W., Mayo E. and W., Sligo, Leit.

F. rottbœllioides Kunth. *F. loliacea* Huds. *Schlerochloa loliacea* Woods. DWARF SEA FESCUE.—Along the coast. *Unrecorded from Lim. and Leit.*, as well as from the three inland divisions. Generally frequent by the sea.

F. Myuros L. CAPON'S-TAIL FESCUE.—Rare. Generally on walls. Absent from the north. **Lim.**—Adare; Askeaton; Grange; Doon; Glin. **Clare**—Killadysert; O'Brien's-bridge; Killaloe; Castle L.; Ballyvaughan. **Gal. SE.**—north of Gort. **Gal. NE.**—Tuam. **Mayo E.**—near Hollymount. **Mayo W.**—Westport.

F. sciuroides Roth. *F. bromoides* L. BARREN FESCUE.—Divisions all. Common.

F. ovina L. SHEEP'S FESCUE.—Divisions all. Ascends to most of the higher summits, and generally assumes a viviparous habit on the hills.

var. **capillata** Hackel.—**Gal. W.**—abundant at Maam.

The viviparous state, which is frequent on the mountains, occurs at sea-level at Killery mouth, on the Mullet and

---

[1] M. C. KNOWLES, *Irish Nat.*, xv., 279–80. 1906.

[2] M. C. KNOWLES and R. D. O'BRIEN, *Irish Nat.*, xviii., 57–68. 1909.

[3] M. C. KNOWLES: Atropis Foucaudi in Ireland. *Irish Nat.*, xiv., 51–53. 1905.

Inishturk, and by the Narrow Lake on L. Mask. The blue-leaved maritime form grows inland on sands at the W. end of L. Nafooey in Gal. W.

F. rubra L. CREEPING FESCUE.—Divisions all. Common. To 1800 feet on Ben Bulben range.

var. **arenaria** (Osbeck).—Frequent on sand-dunes.

F. sylvatica Vill. WOOD FESCUE.—Rocky woods. Rare. **Lim.**—Mount Trenchard; Glenstal. **Gal. SE.** — Dalystown. **Mayo W.**—L. Conn; Drumman wood near L. Cullin. **Sligo**—Knocknarea Glen; Doonee Rock and Rockwood on L. Gill.

F. elatior L. TALL FESCUE.—Divisions all. Frequent.

var. **pratensis** Huds.—Recorded from Lim., Clare, Gal. W., Rosc., Mayo W., Sligo, Leit., Ferm. No doubt frequent.

F. elatior × Lolium perenne. *F. loliacea* Curt.—**Lim.**—Limerick; Plassy. **Gal. NE.**—near Clonbrock.

F. arundinacea Schreb. COARSE FESCUE.—Divisions all *except Rosc.* Frequent.

Bromus giganteus L. *Festuca gigantea* Vill. TALL WOOD BROME-GRASS.—Divisions all. Thinly distributed.

B. asper Murr. *B. ramosus* Huds. HAIRY WOOD BROME-GRASS.—Divisions all. Usually frequent.

var. **serotinus** (Benek.).—**Gal. W.** and **Mayo E.**—Clonbur.

†**B. erectus** Huds. UPRIGHT BROME-GRASS.—**Clare**—abundant in old pastures at Glenforth near Ballyvaughan. **Gal. SE.**—abundant in Garryland wood; Moyode.

B. sterilis L. BARREN BROME-GRASS.—Rare, and generally on the limestone. Absent from the north. **Lim.**—L. Gur; Foynes; Limerick. **Clare**—Coney I. in R. Fergus; Ballyvaughan; between Kilnaboy and Glanquin. **Gal. SE.** — L. Cooter; near Woodford. **Gal. W.**—Salthill. **Gal. NE.**—Barbersfort. **Rosc.**—Roscommon; Athlone.

***B. secalinus** L. RYE BROME-GRASS.—Probably only casual in the district. **Lim.**—Castleconnell; Limerick.

B. commutatus Schrad. CONFUSED BROME-GRASS.—Perhaps frequent. **Lim.** — Foynes; Limerick. **Gal. SE.** — Castle Taylor; near Portumna. **Gal. NE.**—Clonbrock. **Mayo W.**—frequent on Clare I.; railway at Newport. **Sligo** — near Milltown.

B. racemosus L. SMOOTH BROME-GRASS.—Perhaps frequent. **Lim.** — Foynes. **Clare** — Kilrush. **Gal. NE.** — Clonbrock. **Rosc.**—Arigna. **Leit.** — Drumshanbo. The range of this and the preceding are not yet known, and the reliability of some of the records is open to question.

B. mollis L. *B. hordeaceus* L. SOFT BROME-GRASS.—Divisions all. Common.

var. **grossus** Desf.—**Lim.**—Foynes.

§**B. unioloides** H., B., & K.—**Lim.**—casual at Limerick.

Brachypodium sylvaticum R. & S. FALSE BROME-GRASS.—Divisions all. Common.

Lolium perenne L. RYE-GRASS.—Divisions all. Common.

*var. **italicum** Braun.—**Lim.**—Adare; Foynes to Askeaton. **Clare**—Kilrush. **Gal. SE.**—Castle Taylor. **Ferm.**—about L. Erne.

†**L. temulentum** L. DARNEL.—Not common. **Clare**—Ballyvaughan. **Gal. W.**—Inishbofin; Oughterard. **Mayo E.**—Partry. **Mayo W.**—Inishturk.

Agropyron caninum Beauv. *Triticum caninum* Huds. TUFTED WHEAT-GRASS.—Rather rare. **Lim.**—Foynes. **Clare**—Inishmore; Shannon estuary. **Gal. SE.**—Garryland wood. **Sligo**—cliffs of Keshcorran. **Leit.**—limestone ledges in Glenade. **Ferm.**—left bank of R. Erne below Belleek; frequent on limestone cliffs in Carrick district.

A. repens Beauv. *Triticum repens* L. COUCH-GRASS.—Divisions all. Common.

A. pungens R. & S. *Triticum pungens* Pers.—Sea-coast. Rare? **Lim.**—Foynes; Robertstown. **Clare**—frequent in Fergus estuary. **Gal. SE.**—Kilcolgan estuary (var. *littorale* (Reichb.)). Range not worked out.

A. junceum Beauv. *Triticum junceum* L. SEA WHEAT-GRASS.—Common on sandy coasts. Divisions—Clare, Gal. W., Mayo W., Sligo.

A. junceum × **repens**. *A. acutum*, auct. angl.—**Lim.**—Foynes.

Lepturus filiformis Trin. SEA HARD-GRASS.—Muddy coasts. Rare. **Lim.**—Ringmoylan. **Clare**—Kilrush; Rineanna Point; Lehinch; Aran.

var. **incurvatus** (Trin.).—**Lim.**—Foynes. **Clare**—Kilrush.

Nardus stricta L. MAT-WEED; MAT-GRASS.—Divisions all. Calcifuge. Abundant off the limestone. To 2680 feet in Mayo.

Hordeum secalinum Schreb. *H. nodosum* L. *H. pratense* Huds. MEADOW BARLEY.—**Lim.**—near Foynes; Newtown; salt marsh at Ringmoylan. **Clare**—Killadysert; Deer I. Ranges thence round the S. and E. coasts of Ireland.

‡**H. murinum** L. WALL BARLEY.—About towns. Rare, and perhaps only casual. **Lim.**—Limerick. **Gal. SE.**—Ballinasloe. **Rosc.**—Athlone.

Elymus arenarius L. SEA LYME-GRASS.—**Sligo**—Mullaghmore (an old record, in need of confirmation). A rare plant in Ireland, with widely separated stations.

FILICES.

Hymenophyllum tunbridgense Smith. Tunbridge Filmy Fern.—Damp rocks. Not rare. **Lim.**—Glenstal; abundant by the Clare R. **Clare** — Owenslieve R.; Glendree; Cloonagroo; near Feakle. **Gal. W.**—widespread and frequent. **Mayo W.**—chiefly in the Achill district; frequent from sea-level to 1900 feet. **Sligo**—S. shores of L. Gill. **Leit.**—Slieveanieran. **Ferm.** — Drumbad; Correl Glen; near Florencecourt; 400–1000 feet.

H. unilaterale Bory. *H. Wilsoni* Hook. *H. peltatum* Desv. Wilson's Filmy Fern.—Damp rocks. Rather commoner than the last. **Clare** — Cloonagroo; Feakle; Glendree. **Gal. SE.**—Derrygoolin. **Gal. W.**—widespread and frequent. **Mayo E.**—Glendaduff in Slieve Gamph. **Mayo W.**—frequent; from sea-level on Achill to 2590 feet on Mweelrea. **Sligo**—Knockachree; Annacoona; S. side of L. Gill; Moygara; to 1800 feet. **Leit.**—Glenade; Slieveanieran; Benbo. **Ferm.**—frequent in SW.; to 1600 feet on Cuilcagh.

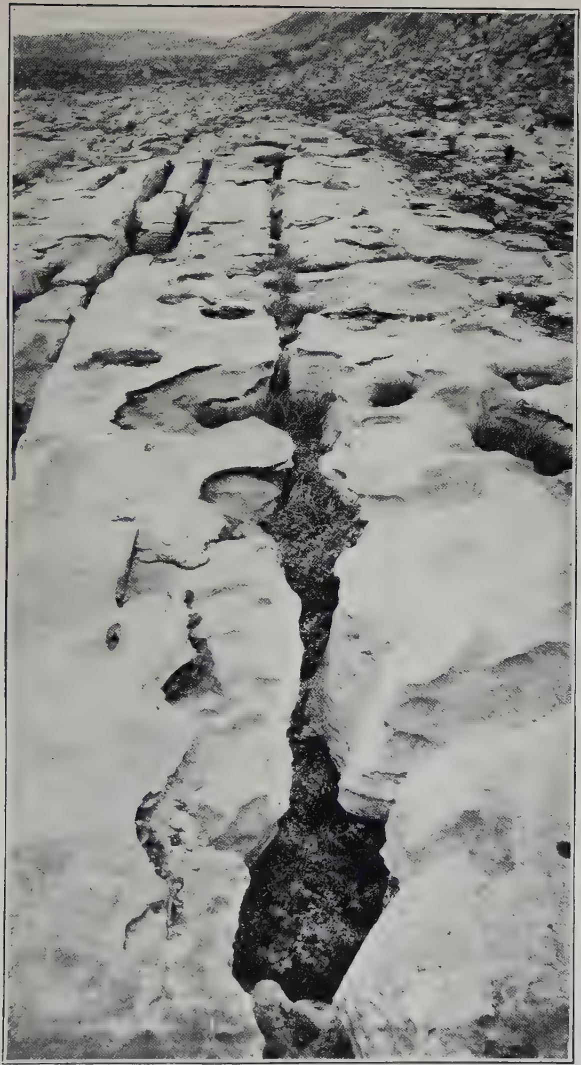
This species, alone among British ferns, has the power of perennial growth at the tip of the frond. The writer has fronds 9 inches long, the result of three seasons' continued growth in a cold frame.

Trichomanes radicans Swartz. Killarney Fern; Bristle Fern. — Damp shady rocks. Very rare. **Lim.** — two localities near Glenstal; Slieve Comailte range; confines of Cork and Limerick. **Clare**—by Owenslieve R. SW. of Ennis. **Ferm.**—Correl Glen.

This beautiful plant has suffered terribly in Ireland from the depredations of collectors.

Adiantum Capillus-Veneris L. Maidenhair. Duḃċoraċ (Black-foot).—Damp rocks. Very local. **Clare**—locally abundant in Burren, chiefly near the sea, ascending to 800 feet; on two areas of crags north of Corofin; abundant on all three Isles of Aran. **Gal. W.**—very sparingly and dwarf in chinks of a limy vein in metamorphic rocks by Lough Bollard near Roundstone. **Gal. NE.**—limestone chinks east of Galway. **Mayo W.**—NNE. of Sheffry, five miles from Killary Harbour; base of Croaghaun on Achill. **Sligo**—by the river at Dromore West; coast at Rosses Point, Drumcliff, and Grange. **Leit.**—cliffs north of Glencar Lake at 700 feet.

Outside our district has but one Irish station—Slieve League in Donegal.



Adiantum Capillus-Veneris, near Black Head, Co. Clare.
Filling joints in limestone pavements, accompanied by *Ceterach officinarum*, *Scolopendium vulgare*, *Rubia peregrina*, &c. May, 1907.

R. Welch, Photo.

To face p. 212.

Pteris Aquilina L. BRACKEN; BRAKE. Ꞃaıṫneaċ.—Divisions all. Common. To 1300 feet on Croaghpatrick.

Cryptogramme crispa Br. *Allosorus crispus* Bernh. PARSLEY FERN.—**Ferm.**—east side of Cuilcagh; not seen since found over forty years ago. Extremely rare in Ireland, a few stunted plants only occurring in Donegal, Derry, Antrim, Down, and Wicklow.

Blechnum Spicant With. *B. boreale* Swartz. *Lomaria Spicant* Desv. HARD FERN.—Divisions all. Conspicuously calcifuge. Abundant off the limestone. To 2000 feet on Ben Bulben range; 2250 feet on Mweelrea.

Asplenium Adiantum-nigrum L. BLACK SPLEENWORT. Ꝺuḃċoꞃaċ (Black-foot).—Divisions all. Frequent, especially on non-calcareous rocks. Rather rare in Rosc., Ferm. To 1150 feet on Twelve Bens.

var. **acutum** (Bory).—**Lim.**—shore below Foynes. **Clare**—"Co. Clare." **Gal. W.**—near Cregduff L. **Mayo E.**—between Cross and Kilmain; near Cong rectory. Certain other records require confirmation.

A. marinum L. SEA SPLEENWORT.—Sea cliffs, among boulders on stony beaches, and on walls near the sea. Locally abundant. **Lim.**—by the Shannon at Foynes. **Clare**—abundant. **Gal. W.**—local. **Mayo W.**—apparently local on mainland; common on larger islands. **Sligo**—Inishmurray; Mullaghmore; Rosses Point; Dromore West. **Leit.**—on the coast.

A viride Huds. GREEN SPLEENWORT.—Mountain rocks. Very local. **Gal. W.**—Lisoughter; Ben Lettery; Muckanaght; Bengower; Glenlosh; 1470–1900 feet. **Mayo W.**—Clare I.; Croaghpatrick; SW. of Dromin chapel. **Sligo**—Keshcorran; Knocknarea; frequent on Ben Bulben range, 700–1600 feet. **Leit.**—Glenade; Faughrey Mtn. **Ferm.**—near Florencecourt; frequent on sandstone scarps W. of Church Hill.

A. Trichomanes L. MAIDENHAIR SPLEENWORT; BLACK MAIDENHAIR.—Divisions all. Frequent. To 2000 feet on Slievemore, Achill I.

A. Ruta-muraria L. WALL RUE.—Divisions all. Frequent. To 1450 feet on Ben Bulben; 1150 on Twelve Bens. Probably originally an inhabitant of calcareous rocks. Has now followed lime-built walls over the whole district, to such remote places as Achill I., and the signal tower on Inishturk. On sandstone scarps in the Carrick district, Ferm.

Athyrium Filix-fœmina Roth. LADY FERN.—Divisions all. Strongly calcifuge. Usually abundant off the limestone. To 1750 feet on the Ben Bulben range.

Ceterach officinarum Willd. *Asplenium Ceterach* L. SCALE FERN.—**Lim.**—Limerick; Foynes; crags at Mullough. **Clare**—throughout, being exceedingly abundant and remarkably luxuriant on the limestone pavements of Burren and Aran, and ascending to 1000 feet. **Gal. SE.**—frequent throughout. **Gal. W.**—rare; chiefly in the east. **Gal. NE.**—frequent. **Rosc.**—widespread but not common. **Mayo E.**—frequent in SW. **Mayo W.**—very local. Castlebar, Westport, and Lough Conn districts; signal tower W. of Slievemore, Achill I. **Sligo**—frequent in E. half. **Leit.**—Garadice L.; frequent in N. **Ferm.**—Poulaphuca; Carragh Creagh. Var. *crenatum* Milde is the prevailing form.

Scolopendrium vulgare Symons. *Phyllitis Scolopendrium* Newm. HART'S-TONGUE. Cneaṁ muice fiaḋ (Wild Pig's Garlic).—Divisions all. Generally common. Immensely abundant on the limestone pavements.

Cystopteris fragilis Bernh. BRITTLE FERN.—**Clare**—abundant in Burren; rare in S. **Gal. SE.**—throughout, rather frequent. **Gal. W.**—Muckanaght; Maumeen; 5 miles NW. of Oughterard; E. of Ross L.; near Cong. **Gal. NE.**—Clonbrock; Birmingham House. **Rosc.**—local and rather rare. **Mayo E.**—Claremorris; Callow; Kilmovee; Cong; Partry. **Mayo W.**—Loughty Mtn. to 2400 feet; Mallaranny; 1800–2100 feet on Slievemore, Achill I. **Sligo**—common in E. half. **Leit.**—Annaghearly L.; common in N. **Ferm.**—frequent in SW.

var. **dentata** Hook.—**Sligo** and **Leit.**—Ben Bulben district. **Ferm.**—frequent in SW.

Aspidium Lonchitis Swartz. *Polystichum Lonchitis* Roth. HOLLY FERN.—Mountain cliffs and slopes. **Gal. W.**—Muckanaght at 1500 feet. **Sligo**—Ben Bulben, 1150–1600 feet; Octogorea. **Leit.**—frequent in Glenade. Elsewhere in Ireland in Kerry and Donegal only.

A. aculeatum Swartz. *Polystichum aculeatum* Roth. PRICKLY SHIELD FERN.—Divisions all. Local. Frequent in Clare, Gal. SE. and NE., Ferm. Rare in Lim., Gal. W. (to 1500 feet), Rosc., Mayo E. and W., Leit. Var. *lobatum* is probably frequent.

A. angulare Kit. *Polystichum angulare* Presl. SOFT SHIELD FERN.—Divisions all. Frequent, especially off the limestone.

Lastrea Thelypteris Bory. MARSH FERN.—Swampy places. Rare. **Clare**—Dromoland; R. Fergus near Ennis; Inchicronan L.; Ballycullinan L. **Gal. SE.**—L. Fingall; Castle Taylor; Portumna demesne, and by L. Derg S. of Portumna. **Rosc.**—by the Shannon above Athlone; Rockingham. **Mayo E.**—Lakeview and Moore Hall on L. Carra.

L. Oreopteris Presl. *L. montana* T. Moore. *Aspidium Oreopteris* Swartz. SWEET MOUNTAIN FERN.—Locally abundant, chiefly on non-calcareous hill-ranges. **Lim.**—glen of Bilboa R. **Clare**—widespread but rare. **Gal. W.**—locally frequent. **Rosc.**—Slieve Bane; Gayfield. **Mayo W.**—Mweelrea; Owenmore R.; Dugort at 300 feet. **Leit.**—Glenade to 1000 feet. **Ferm.**—Florencecourt; W. of Church Hill.

L. Filix-mas Presl. *Aspidium Filix-mas* Swartz. MALE FERN.—Divisions all. Common. To 2380 feet in Mayo. Vars. *affinis* Bab. and *paleacea* T. Moore are both abundant.

L. remota Moore. *Aspidium remotum* Braun. *L. Filix-mas* × *spinulosa*? REMOTE SHIELD FERN.—**Gal. SE.**—A single clump in the woods at Dalystown. The only Irish station of this very rare supposed hybrid.[1]

L. spinulosa Presl. *Aspidium spinulosum* Swartz. LESSER BROAD FERN.—Divisions all *except Clare*, but the Gal. W. record is old and vague. Noted as frequent only in SE. Leit. Mostly in the drier parts of lowland bogs, and on peaty banks.

var. **exaltata** Syme.—**Lim.**—Thornfields.

L. dilatata Presl. *L. aristata* Rendle and Britten. *Aspidium dilatatum* Swartz. BROAD FERN.—Divisions all. Common. To 2640 feet in Mayo, and 2100 feet on Ben Bulben range.

L. æmula Brackn. *L. recurva* Newm. *Aspidium æmulum* Swartz. BREE'S FERN.—Divisions all *except Rosc.* Unevenly distributed. Frequent throughout Gal. W. and Mayo W., and also in E. Sligo, N. Leit., W. Ferm. Chiefly about the hills. From sea-level to 2000 feet in Achill; to 1200 feet on Twelve Bens. A characteristic western fern, capable of withstanding great exposure (as on Achill) when it is accompanied by continual moisture.

Polypodium vulgare L. POLYPODY.—Divisions all. Common. To 2380 feet on Twelve Bens. Abnormal forms varying from the toothed var. *serratum* to the large triangular-fronded var. *semilacerum* occur not infrequently in limestone districts. Var. *cambricum* has been found on L. Gill, Sligo.

P. Dryopteris L. *Phegopteris Dryopteris* Fée. OAK FERN.—Very rare. **Clare**—roadside between Roadford[2] and the Cliffs of Moher. **Sligo**—Lough Talt. **Leit.**—Benbo at 800 feet.

P. Phegopteris L. *Phegopteris polypodioides* Fée. BEECH FERN.—**Clare**—west of Ennis; Glendree; Slieve Callan. **Gal.**

---

[1] R. LL. PRAEGER: Lastrea remota in Ireland. *Irish Nat.*, xviii. 1909.

[2] Not Broadford.

W.—rather rare; chiefly in E. **Mayo W.**—SW. of Dromin chapel; Toormakeady; Brachloon wood near Westport. **Sligo**—abundant in one locality W. of Ballysadare at 500 feet. **Leit.**—Glenade Mtn. **Ferm.**—deerpark, Brookeborough; Cuilcagh at 1800 feet.

Osmunda regalis L. Royal Fern.—Divisions all. One of the most characteristic plants of W. Ireland. Avoids a limestone soil, but in limestone districts generally finds plenty of refuges on the bogs and in swamps. Attains its maximum in Gal. W. and Mayo W., spreading to all the larger islands, and even to the storm-swept rock-ledge of Inishkea. To 900 feet in Mayo and Ferm.

Ophioglossum vulgatum L. Adder's-tongue.—Divisions all. Probably more abundant than the records indicate. Occurs on the Mayo islands, including Inishkea.

Botrychium Lunaria Swartz. Moonwort.—Divisions all. As widespread as the last in W. Ireland, but more frequently affects upland situations, though descending to sea-level. To 1500 feet in Sligo.

EQUISETACEÆ.

Equisetum maximum Lamk. *E. Telmateia* Ehrh. Great Horsetail.—Divisions all. Local. Rare in Gal. SE. and NE., Mayo W., Sligo. More or less frequent elsewhere.

E. arvense L. Field Horsetail.—Divisions all. Common. To 1050 feet on Ben Bulben range.

E. pratense Ehrh. *E. umbrosum* Willd. Blunt-topped Horsetail.—**Ferm.**—sandstone scarp S. of Poulaphuca cliffs near Church Hill. Elsewhere in Ireland in Donegal and Antrim only.

E. sylvaticum L. Wood Horsetail.—Divisions all, generally frequent off the limestone, especially in hilly country. To 1600 feet in Leit.

E. palustre L. Marsh Horsetail.—Divisions all. Common. To 2000 feet in Mayo and 1400 feet in Sligo.

var. **nudum** Newm.—**Sligo**—L. Gill near Doonee Rock. **Leit.**—L. Melvin.

var. **polystachyum** Weigel.—**Lim.**—Thornfields. **Gal. SE.**—Marble Hill.

E. limosum L. Water Horsetail.—Divisions all. Common.

var. **fluviatile** (L.)—Divisions all. Common.

E. hyemale L. Dutch Rush.—Rare. **Clare**—Parteen. **Gal. SE.**—Dalystown. **Leit.**—by Bonet R. near Lurganboy. **Ferm.**—Colebrook R.; Correl Clen.

E. trachyodon Braun.—Rare. **Clare**—by outlet stream at Inchicronan L. **Gal. SE.** — Dalystown; Chevy Chase. **Mayo W.**—L. Cullin. **Sligo**—near Glencar L. **Ferm.**—S. margin of Bunnahone L.

E. variegatum Schleich. VARIEGATED HORSETAIL.—Rather rare. **Lim.**—Barrigone bog near Foynes. **Clare**—Inishmore; Ballycullinan L.; E. of Rockforest L. **Gal. SE.**—Castle Taylor. **Gal. W.**—L. Bollard near Roundstone. **Gal. NE.**—by L. Corrib S. of Keekil. **Mayo E.**—Bush I. in L. Carra. **Sligo**—Feenagh L.; L. Talt. **Leit.**—Glencar. The above records all refer to var. *majus* Syme.

var. **arenarium** Newm.—**Sligo**—sandhills at Mullaghmore.

LYCOPODIACEÆ.

Lycopodium Selago L. FIR CLUB-MOSS. Crúibíniḋ sionnaiġ (Fox's Paws).—Divisions all. Frequent on mountains and peat bogs. To 2640 feet in Mayo, and 2100 feet on Ben Bulben range.

L. inundatum L. MARSH CLUB-MOSS.—Wet heaths. Very rare. **Gal. W.**—plentiful on wet heath immediately west of Maam; by a small lake near Letterfrack. **Mayo W.**—edge of Sraheens L., Achill I. Elsewhere in Ireland confined to Kerry and Cork.

L. clavatum L. COMMON CLUB-MOSS.—Grassy heaths. Rare. **Gal. SE.** — Attymon bog. **Gal. W.** — Killaguile. **Rosc.**—Curlew mountains. **Mayo W.** — Bengorm at 1900 feet. **Sligo**—L. Talt. **Ferm.**—Cuilcagh at 1400 feet.

L. alpinum L. MOUNTAIN CLUB-MOSS.—Mountain heaths. Rare. **Gal. W.**—near Maumeen; Ben Lettery. **Mayo W.**—Sheffry; Glenummera; Curraun Achill; Mweelrea; Loughty Mtn.; 1560-2500 feet. **Sligo**—"mountains of Sligo"—a vague record not recently verified.

SELAGINELLACEÆ.

Selaginella selaginoides Gray. *S. spinulosa* Braun. LITTLE PRICKLY CLUB-MOSS.—Divisions all *except Lim.* Generally frequent, on coast sand-hills, heaths, and mountains. To 2100 feet in Mayo, and 1400 feet in Ben Bulben district.

Isoetes lacustris L. QUILLWORT. — Local. **Gal. W.** — about Letterfrack; Glendalough; Benchoona; Maumeen. **Rosc.**—Kilmore Bay on L. Ree. **Mayo W.**—Newport; L. Drumderg; Scardaun L.; frequent on Achill; Inishturk; L. Nambrackkeagh. **Leit.**—S. end of L. Allen. From sea-level on Achill to 1800 feet on Benchoona, W. Galway.

I. echinospora Durr. Prickly-spored Quillwort.—**Clare**—Monmor L. **Gal. W.**—L. Gowlanagower and L. Nagrooaun on Inishbofin. **Mayo W.**—Newport.

Pilularia globulifera L. Pillwort.—Very rare. **Gal. W.**—Pollacappul L. near Kylemore; W. end of Glendalough L., in 4–8 feet of water, with leaves 6–12 in. long; by L. Mask N. of Clonbur, at Narrow Lake, and at Maamtrasna.

CHARACEÆ.[1]

Chara fragilis Desv.—Divisions all *except Leit.* Common.

var. **barbata** Gant.—**Clare**—Killaloe. **Gal. SE**—frequent. **Gal. NE.**—Clonbrock. **Rosc.**—Rockville. **Mayo E.**—Kilmovee; SE. end of L. Mask; Cong. **Mayo W.**—Clare I.; L. Conn near Derreen.

var. **capillacea** Coss. & G.—**Gal. W.**—Renvyle. **Leit.**—Glenade L. **Ferm.**—3 miles N. of Enniskillen.

var. **Hedwigii** Kuetz.—**Gal. W.** and **Mayo E.**—Cong. **Sligo**—Garvogue River.

var. **delicatula** Braun.—Divisions all *except Lim., Clare, Gal. SE.*

C. aspera Willd.—Divisions all *except Lim., Rosc., Sligo.* Frequent.

var. **curta** Braun.—**Gal. SE.**—Portumna demesne.

var. **subinermis** Kuetz.—**Gal. SE.**—Kilcolgan. **Mayo W.**—Achill; Mullet. **Sligo**—Garvogue River. **Leit.**—Glenade L. **Ferm.**—Meenameen L. near Carrick.

var. **lacustris** H. & J. G.—**Gal. W.**—Roundstone. **Mayo W.**—L. Cullin. Forms approaching *lacustris* are not uncommon.

subsp. **desmacantha** H. & J. G.—Divisions all *except Clare.* Frequent.

C. polyacantha Braun.—Lakes and drains, chiefly on the limestone. Divisions all *except Leit., Ferm.* Frequent and often abundant, except in the north and in the Galway-Mayo metamorphic area.

C. contraria Kuetz.—**Lim.**—Mullough R. **Gal. SE.**—frequent in L. Derg. **Gal. NE.** and **Rosc.**—R. Suck at Bellagill bridge. **Mayo W.**—Ballina. **Leit.**—L. Allen.

var. **hispidula** Braun.—**Gal. W.** and **Mayo E.**—Cong.

C. tomentosa L.—In the British Isles confined to the Shannon basin—to the expansions of the Shannon itself and the lakes of Westmeath. **Gal. SE.**—L. Derg near Woodford and near Portumna. **Rosc.**—L. Ree at Rindown Castle; Athlone. A large and handsome species, but in the Shannon often so encrusted with lime as to be almost uncollectable.

---

[1] See R. Ll. Praeger: Gleanings in Irish Topographical Botany. Proc. Roy. Irish Acad., xxiv., Sect. B., 88–94. 1902.

C. hispida L. Divisions all *except Leit.*, *Ferm.* Generally common.

var. **rudis** Braun.—Divisions all *except Leit.*, *Ferm.* As common as the type, and like it decreasing northward.

C. vulgaris L.—Divisions all *except Mayo E.* Usually common.

var. **longibracteata** Kuetz.—Divisions all *except Lim.*, *Gal. W.* To 700 feet in Clare.

var. **papillata** Wallr.—**Lim.**—Limerick; Ballyclough House near Foynes. **Gal. SE.**—near Portumna. **Mayo W.**—Ballina.

C. canescens Loisel.—**Gal. NE.**—by the shore at Rinmore, east of Galway. Elsewhere in Ireland found only in Kerry and Wexford.

Tolypella glomerata Leonh.—**Lim.**—Limerick. **Clare**—above Athlunkard bridge. **Gal. SE.**—Rinmaher Point on L. Derg. **Sligo** — Glencar L. **Leit.** — L. Melvin; abundant in Glencar L.; Glenade L. **Ferm.**—L. Erne at Belleek.

Nitella tenuissima Kuetz.—**Gal. NE.**—bog-holes at Ballindooly. Elsewhere in Ireland recorded only from Westmeath.

N. translucens Ag.—**Gal. W.**—L. Cregduff; Clifden. **Mayo W.**—Newport; Clare I. Distinctly calcifuge in Ireland.

N. flexilis Ag.—**Rosc.**—L. Allen at Arigna. **Mayo E.**—Cong. **Leit.**—L. Allen. **Ferm.**—Rossford Point.

var. **nidifica** Wallm.—**Rosc.**—L. Allen at Arigna. An extremely rare variety.

N. opaca Ag.—Divisions all *except Clare*, *Sligo.* Frequent.

INDEX TO PLANT-NAMES IN SYSTEMATIC SECTION.

Acer campestre, 131.
    Pseudo-platanus, 131.
Achillæa Millefolium, 156.
    Ptarmica, 156.
Adder's-tongue, 216.
Adiantum Capillus-Veneris, 212.
Ægopodium Podagraria, 150.
Æthusa Cynapium, 151.
Agrimonia Eupatoria, 141.
    odorata, 141.
Agrimony, 140.
    Fragrant, 140.
    Hemp, 154.
Agropyron acutum, 211.
    caninum, 211.
    junceum, 211.
    pungens, 211.
    repens, 211.
Agrostis alba, 205.
    canina, 205.
    tenuis, 205.
    vulgaris, 205.
Aira alpina, 206.
    cæspitosa, 206.
    caryophyllea, 206.
    flexuosa, 206.
    præcox, 206.
    setacea, 206.
    uliginosa, 206.
Ajuga pyramidalis, 178.
    reptans, 178.
Alchemilla arvensis, 140.
    vulgaris, 140.
Alder, 184.
Alexanders, 149.
Alisma Plantago-aquatica, 195.
    ranunculoides, 195.
Alismaceæ, 195.
Alkanet, 168.
Allium Babingtonii, 192.
    Schænoprasum, 192.
    ursinum, 192.
    vineale, 192.
Allosorus crispus, 213.
Allseed, 129.
Alnus glutinosa, 184.
    rotundifolia, 184.
Alopecurus agrestis, 205.
    geniculatus, 205.
    myosuroides, 205.
    pratensis, 205.
Alsine verna, 126.
Althæa officinalis, 128.
Alyssum maritimum, 118.
Amaryllideæ, 191.
Ambrosia artemisiæfolia, 162.
Ammophila arenaria, 205.
Anacharis Alsinastrum, 187.
Anagallis arvensis, 167.
    tenella, 167.
Anchusa sempervirens, 168.
Andromeda, Marsh, 163.
    Polifolia, 163.
Anemone nemorosa, 113.
    Wood, 113.
Angelica sylvestris, 151.
    Wild, 151.
Antennaria dioica, 155.
Anthemis arvensis, 156.
    Cotula, 156.
    nobilis, 156.
Anthoxanthum odoratum, 205.
Anthriscus sylvestris, 150.
    vulgaris, 150.
Anthyllis Vulneraria, 133.
Antirrhinum majus, 170.
    Orontium, 170.
Apargia hispida, 161.
Apium graveolens, 149.
    inundatum, 149.
    nodiflorum, 149.
Apocyaneæ, 167.
Apple, Crab, 143.
Aquilegia vulgaris, 115.
Arabis ciliata, 118.
    hirsuta, 118.
    petræa, 118.
Araliaceæ, 151.

Arctium intermedium, 158.
    majus, 158.
    minus, 158.
    Newbouldii, 158.
Arctostaphylos Uva-ursi, 163.
Arenaria ciliata, 126.
    peploides, 126.
    serpyllifolia, 126.
    tenuifolia, 126.
    trinervia, 126.
    verna, 126.
Armeria maritima, 166.
Aroideæ, 194.
Arrhenatherum avenaceum, 206.
    elatius, 206.
Arrow-grass, Marsh, 195.
    Sea, 195.
Arrow-head, 195.
Artemisia Absinthium, 157.
    maritima, 157.
    vulgaris, 157.
Arum maculatum, 194.
Arundo Phragmites, 206.
Ash, 167.
Ash, Mountain, 143.
Aspen, 185.
Asperula cynanchica, 153.
    odorata, 153.
Asphodel, Bog, 192.
Asphodelus fistulosus, 192.
Aspidium aculeatum, 214.
    æmulum, 215.
    angulare, 214.
    dilatatum, 215.
    Filix-mas, 215.
    Lonchitis, 214.
    Oreopteris, 215.
    remotum, 215.
    spinulosum, 215.
Asplenium Adiantum-nigrum, 213.
    Ceterach, 214.
    marinum, 213.
    Ruta-muraria, 213.
    Trichomanes, 213.
    viride, 213.
Aster lævis, 154.
    Tripolium, 154.
Astragalus danicus, 133.
    Hypoglottis, 133.
Athyrium Filix-fæmina, 213.
Atriplex angustifolia, 180.
    Babingtonii, 180.
    erecta, 180.
    hastata, 180.
Atriplex littoralis, 180.
    patula, 180.
    portulacoides, 180.
Atropa Belladonna, 170.
Avena fatua, 206.
    flavescens, 206.
    pubescens, 206.
    strigosa, 206.
Avens, Mountain, 139.
    Water, 139.
    Wood, 139.
Awl-wort, 119.

Ballota nigra, 178.
Balm, Common, 177.
Barbarea intermedia, 118.
    vulgaris, 117.
Barley, Meadow, 211.
    Wall, 211.
Bartsia Odontites, 174.
    Red, 174.
Basil, Wild, 177.
Beak-rush, Brown, 200.
    White, 201.
Bear-berry, 163.
Beard-grass, Annual, 205.
Bedstraw, Great Hedge, 153.
    Heath, 153.
    Lady's, 153.
    Least Mountain, 153.
    Marsh, 153.
    Northern, 152.
    Rough Marsh, 153.
    Upright, 153.
Beet, Sea, 180.
Bell-flower, Creeping, 162.
Bell-Heather, 163.
Bellis perennis, 154.
Bent, 205.
    Brown, 205.
    Fine-leaved, 205.
    Marsh, 205.
Beta maritima, 180.
Betula pubescens, 183.
    tomentosa, 183.
    verrucosa, 183.
Bidens cernua, 155.
    tripartita, 155.
Bilberry, 162.
Bindweed, Black, 180.
    Great, 169.
    Sea, 169.
    Small, 169.
Birch, Common, 183.

Birch, White, 183.
Bird's-nest, 187.
    Yellow, 166.
Bistort, Alpine, 181.
    Water, 181.
Bitter-sweet, 169.
Blackstonia perfoliata, 167.
Blackthorn, 134.
Bladderwort, Common, 175.
    Intermediate, 175.
    Lesser, 175.
Blechnum boreale, 213.
    Spicant, 213.
Blinks, Water, 127.
Blite, Sea, 180.
Blitum capitatum, 180.
Bluebottle, Corn, 159.
Blue-eyed Grass, 191.
Blysmus rufus, 200.
Bog-bean, 168.
Bog Myrtle, 183.
Bog-rush, Black, 201.
Borage, 168.
Boragineæ, 168.
Borago officinalis, 168.
Botrychium Lunaria, 216.
Brachypodium sylvaticum, 211.
Bracken, 213.
Brake, 213.
Bramble, 135.
    Stone, 139.
Brassica alba, 120.
    nigra, 120.
    oleracea, 120.
    Rapa, 120.
    Sinapis, 120.
Briza media, 208.
Brome-grass, Barren, 210.
    Confused, 210.
    False, 211.
    Hairy Wood, 210.
    Rye, 210.
    Smooth, 210.
    Soft, 210.
    Tall Wood, 210.
    Upright, 210.
Bromus asper, 210.
    commutatus, 210.
    erectus, 210.
    giganteus, 210
    hordeaceus, 210.
    mollis, 210.
    racemosus, 210.
    ramosus, 210.
Bromus secalinus, 210.
    sterilis, 210.
    unioloides, 211.
Brooklime, 172.
Brookweed, 167.
Broom, 132.
Broomrape, Ivy, 175.
    Lesser, 175.
    Red, 175.
Bryony, Black, 192.
Buck's-horn, 179.
Buckthorn, Alder, 131.
    Purging, 131.
Buckwheat, 181.
Bugle, Common, 178.
    Pyramidal, 178.
Bugloss, Field, 168.
    Viper's, 169.
Bullace, 134.
Bullrush, 200.
    Glaucous, 200.
    Three-edged, 200.
Bunium flexuosum, 150.
Burdock, Great, 158.
    Lesser, 158.
Bur-Marigold, Nodding, 155.
    Trifid, 155.
Burnet, Great, 141.
    Salad, 141.
Burnet-Saxifrage, 150.
    Greater, 150.
Bur-Reed, Branched, 194.
    Floating, 194.
    Small, 194.
    Unbranched, 194.
Butomus umbellatus, 195.
Butterbur, 157.
Butterwort, Common, 175.
    Large-flowered, 175.
    Pale, 176.

Cabbage, Sea, 120.
Cakile maritima, 121.
Calamagrostis epigejos, 205.
Calamint, 177.
Calamintha Clinopodium, 177.
    montana, 177.
    officinalis, 177.
    vulgare, 177.
Callitriche autumnalis, 147.
    hamulata, 147.
    intermedia, 147.
    obtusangula, 147.
    pedunculata, 147.

Callitriche platycarpa, 147.
  stagnalis, 147.
Calluna vulgaris, 163.
Caltha palustris, 114.
  radicans, 115.
Calystegia Sepium, 169.
  Soldanella, 169.
Camelina sativa, 120.
Campanula rapunculoides, 162.
  rotundifolia, 162.
Campanulaceæ, 162.
Campion, Bladder, 124.
  Red, 124.
  Sea, 124.
  White, 124.
Canadian Weed, 187.
Cannabis sativa, 183.
Caprifoliaceæ, 152.
Capsella Bursa-pastoris, 120.
Caraway, 149.
Cardamine flexuosa, 118.
  hirsuta, 118.
  pratensis, 118.
Carduus crispus, 158.
  Marianus, 158.
  nutans, 158.
  pycnocephalus, 158.
  tenuiflorus, 158.
Carex acuta, 202.
  acutiformis, 204.
  ampullacea, 204.
  aquatilis, 202.
  arenaria, 201.
  axillaris, 201.
  binervis, 203.
  caryophyllea, 203.
  contigua, 201.
  curta, 202.
  diandra, 201.
  dioica, 201.
  distans, 203.
  disticha, 201.
  divulsa, 201.
  echinata, 201.
  elata, 202.
  elongata, 202.
  extensa, 203.
  flacca, 202.
  flava, 203.
  filiformis, 204.
  fulva, 203.
  glauca, 202.
  Goodenowii, 202.
  gracilis, 202.
Carex helodes, 203.
  hirta, 204.
  Hornschuchiana, 203.
  Hudsonii, 202.
  inflata, 204.
  lævigata, 203.
  lasiocarpa, 204.
  leporina, 202.
  limosa, 203.
  muricata, 201.
  ovalis, 202.
  pallescens, 203.
  paludosa, 204.
  panicea, 203.
  paniculata, 201.
  paradoxa, 201.
  pendula, 203.
  pilulifera, 203.
  præcox, 203.
  Pseudo-Cyperus, 204.
  pulicaris, 201.
  remota, 201.
  rigida, 202.
  riparia, 204.
  rostrata, 204.
  stellulata, 201.
  stricta, 202.
  strigosa, 203.
  sylvatica, 203.
  teretiuscula, 201.
  trinervis, 202.
  verna, 203.
  vesicaria, 204.
  vulgaris, 202.
  vulpina, 201.
  xanthocarpa, 204.
Carlina vulgaris, 157.
Carline Thistle, 157.
Carrot, Wild, 151.
Carum Carvi, 149.
  Petroselinum, 149.
Caryophylleæ, 124.
Castalia alba, 115.
Catabrosa aquatica, 207.
Catchfly, English, 124.
  Garden, 124.
  Striated, 124.
Cat Mint, 177.
Cat's-ear, Long-rooted, 161.
Caucalis Anthriscus, 151.
  nodosa, 151.
Celandine, 116.
  Lesser, 114.
Celastrineæ, 131.

Celery, Wild, 149.
Centaurea Cyanus, 159.
    Calcitrapa, 159.
    nigra, 159.
    Scabiosa, 159.
    solstitialis, 159.
Centaureum umbellatum, 167.
Centaury, 167.
Centranthus ruber, 154.
Centunculus minimus, 167.
Cephalanthera ensifolia, 188.
    longifolia, 188.
Cerastium arvense, 125.
    glomeratum, 125.
    semidecandrum, 125.
    tetrandrum, 125.
    triviale, 125.
    viscosum, 125.
    vulgatum, 125.
Ceratophylleæ, 185.
Ceratophyllum demersum, 185.
Ceterach officinarum, 214.
Chærophyllum temulum, 150.
Chamomile, 156.
    Corn, 156.
    Field, 156.
    Stinking, 156.
Chara aspera, 218.
    canescens, 219.
    contraria, 218.
    desmacantha, 218.
    fragilis, 218.
    hispida, 219.
    polyacantha, 218.
    tomentosa, 218.
    vulgaris, 219.
Characeæ, 218.
Charlock, 120.
Cheiranthus Cheiri, 117.
Chelidonium majus, 116.
Chenopodiaceæ, 179.
Chenopodium album, 179.
    Bonus-Henricus, 180.
    capitatum, 180.
    murale, 180.
    rubrum, 179.
Cherry, Bird, 135.
    Dwarf, 135.
    Wild, 135.
Chervil, Rough, 150.
Chickweed, 125.
Chicory, 159.
Chives, 192.
Chlora perfoliata, 167.
Chrysanthemum Leucanthemum, 156.
    Parthenium, 156.
    segetum, 156.
Chrysosplenium oppositifolium, 145.
Cicely, Sweet, 150.
Cicer arietinum, 133.
Cichorium Intybus, 159.
Circuta virosa, 149.
Cinquefoil, Creeping, 140.
    Marsh, 140.
    Shrubby, 140.
Circæa alpina, 148.
    lutetiana, 148.
Cistineæ, 122.
Cladium germanicum, 201.
    jamaicense, 201.
    Mariscus, 201.
Clarkia concinna, 148.
Clary, 177.
Cleavers, 153.
Clematis Vitalba, 113.
Clover, Alsike, 133.
    Dutch, 133.
    Red, 132.
    White, 133.
    Zigzag, 132.
Club-moss, Fir, 217.
    Common, 217.
    Little Prickly, 217.
    Marsh, 217.
    Mountain, 217.
Club-rush, Brown, 200.
    Wood, 200.
    Sea, 200.
Cnicus arvensis, 158.
    lanceolatus, 158.
    palustris, 158.
    pratensis, 158.
Cochlearia anglica, 119.
    Armoracia, 119.
    danica, 119.
    grænlandica, 119.
    officinalis, 118.
Coltsfoot, 157.
Columbine, 115.
Comarum palustre, 140.
Comfrey, 168.
Compositæ, 154.
Coniferæ, 186.
Conium maculatum, 149.
Conopodium denudatum, 150.
    majus, 150.
Convolvulaceæ, 169.
Convolvulus arvensis, 169.

Convolvulus sepium, 169.
  Soldanella, 169.
Cornaceæ, 152.
Corn-cockle, 124.
Cornel, 152.
Corn-Salad, 154.
  Narrow-fruited, 154.
  Sharp-fruited, 154.
Cornus sanguinea, 152.
Coronilla Securidaca, 133.
Coronopus didyma, 120.
  procumbens, 120.
Corydalis lutea, 116.
Corylus Avellana, 184.
Cotton-grass, Broad-leaved, 200.
  Hare's-tail, 200.
  Narrow-leaved, 200.
Cotyledon Umbilicus-Veneris, 145.
Couch-grass, 211.
Cowberry, 162.
Cow-Parsley, 150.
Cowslip, 166.
Cow-wheat, 174.
Crab Apple, 143.
Crambe maritima, 121.
Cranberry, 162.
Cranesbill, Bloody, 129.
  Dusky, 129.
  Long-stalked, 130.
  Meadow, 129.
  Mountain, 130.
  Round-leaved, 130.
  Shining, 130.
  Small-flowered, 130.
  Soft, 130.
  Wood, 130.
Crassulaceæ, 145.
Cratægus Oxyacantha, 143.
Creeping Jenny, 166.
Crepis biennis, 159.
  capillaris, 159.
  paludosa, 159.
  taraxacifolia, 159.
  virens, 159.
Cress, Broad-podded Marsh, 117.
  Fringed Rock, 118.
  Hairy Bitter, 118.
  Mountain, 118.
  Narrow-podded Marsh, 117.
  Penny, 121.
  Rock, 118.
  Thale, 119.
  Water, 117.
  Winter, 117.
Cress, Intermediate Winter, 118.
  Wood Bitter, 118.
Crithmum maritimum, 150.
Crosswort, 152.
Crowberry, 185.
Crowfoot, Bulbous, 114.
  Meadow, 114.
  Water, 113.
Cruciferæ, 117.
Cryptogramme crispa, 213.
Cuckoo-Pint, 194.
Cudweed, Common, 155.
  Least, 155.
  Marsh, 155.
  Mountain, 155.
  Upright, 155.
Cupuliferæ, 183.
Currant, Black, 145.
  Red, 145.
Cuscuta Epilinum, 169.
  Trifolii, 169.
Cynosurus cristatus, 207.
  echinatus, 207.
Cyperaceæ, 199.
Cystopteris fragilis, 214.
Cytisus scoparius, 132.

Dabeocia cantabrica, 165.
  polifolia, 165.
Dactylis glomerata, 208.
Daisy, 154.
  Dog, 156.
Dame's Violet, 119.
Dandelion, 161.
Danewort, 152.
Darnel, 211.
Daucus Carota, 151.
Dead-Nettle, Cut-leaved, 178.
  Intermediate, 178.
  Red, 178.
  White, 178.
Deschampsia alpina, 206.
  cæspitosa, 206.
  discolor, 206.
  flexuosa, 206.
Devil's-bit, 154.
Dew-berry, 139.
Digitalis purpurea, 171.
Dioscorieæ, 192.
Diplotaxis muralis, 120.
  tenuifolia, 120.
Dipsaceæ, 154.
Dipsacus sylvestris, 154.
Dittander, 121.

Dock, Bloody, 181.
  Broad-leaved, 181.
  Curled, 182.
  Golden, 181.
  Sharp-leaved, 181.
  Water, 182.
  Wood, 181.
Dodder, Clover, 169.
  Flax, 169.
Dog Daisy, 156.
Dogwood, 152.
Dove's-foot, 130.
Draba incana, 118.
  verna, 118.
Dropwort, 135.
  Seaside, 151.
  Water-, 151.
Drosera anglica, 146.
  intermedia, 146.
  longifolia, 146.
  obovata, 146.
  rotundifolia, 146.
Droseraceæ, 146.
Dryas octopetala, 139.
Duckweed, Common, 194.
  Gibbous, 194.
  Greater, 194.
  Ivy-leaved, 194.
Dyer's Weed, 121.

Echium vulgare, 169.
Elatine hexandra, 128.
Elatineæ, 128.
Elder, 152.
  Dwarf, 152.
Elecampane, 155.
Eleocharis acicularis, 199.
  multicaulis, 199.
  palustris, 199.
  uniglumis, 199.
Elm, Wych, 183.
Elodea canadensis, 187.
Elymus arenarius, 211.
Empetraceæ, 185.
Empetrum nigrum, 185.
Endymion nutans, 192.
Epilobium alsinefolium, 148.
  angustifolium, 148.
  hirsutum, 148.
  montanum, 148.
  obscurum, 148.
  palustre, 148.
  parviflorum, 148.
Epipactis atro-rubens, 188.
Epipactis latifolia, 188.
  ovalis, 188.
  palustris, 188.
Equisetaceæ, 216.
Equisetum arvense, 216.
  hyemale, 216.
  limosum, 216.
  maximum, 216.
  palustre, 216.
  pratense, 216.
  sylvaticum, 216.
  Telmateia, 216.
  trachyodon, 217.
  umbrosum, 216.
  variegatum, 217.
Erica cinerea, 163.
  Crawfordii, 163.
  hibernica, 164.
  Mackaii, 163.
  mediterranea, 164.
  Stuarti, 165.
  Tetralix, 163.
Ericaceæ, 163.
Erigeron acre, 155.
Eriocaulon septangulare, 198.
Eriocauloneæ, 198.
Eriophorum angustifolium, 200.
  latifolium, 200.
  vaginatum, 200.
Erodium cicutarium, 130.
  maritimum, 130.
  moschatum, 130.
Erophila vulgaris, 118.
Eryngium maritimum, 149.
Erysimum cheiranthoides, 119.
  orientale, 119.
Erythræa Centaureum, 167.
Euonymus europæus, 131.
Eupatorium cannabinum, 154.
Euphorbia exigua, 182.
  Helioscopia, 182.
  hiberna, 182.
  Paralias, 182.
  Peplus, 182.
  portlandica, 182.
Euphorbiaceæ, 182.
Euphrasia borealis, 172.
  brevipila, 172.
  curta, 172.
  foulaensis, 172.
  gracilis, 172.
  nemorosa, 172.
  officinalis, 172.
  Rostkoviana, 172.

Euphrasia salisburgensis, 173.
    scottica, 172.
    stricta, 172.
Eyebright, 172.

Fagopyrum esculentum, 181.
    sagittatum, 181.
Felwort, 168.
Fennel, 150.
Fern, Beech, 215.
    Bree's, 215.
    Bristle, 212.
    Brittle, 214.
    Broad, 215.
    Filmy, 212.
    Hard, 213.
    Holly, 214.
    Killarney, 212.
    Lady, 213.
    Lesser Broad, 215.
    Maidenhair, 212.
    Male, 215.
    Marsh, 214.
    Oak, 215.
    Parsley, 213.
    Prickly Shield, 214.
    Remote Shield, 215.
    Royal, 216.
    Scale, 214.
    Shield, 214.
    Soft Shield, 214.
    Sweet Mountain, 215.
    Tunbridge Filmy, 212.
    Wilson's Filmy, 212.
Ferns, 212.
Fescue, Barren, 209.
    Capon's-tail, 209.
    Coarse, 210.
    Creeping, 210.
    Dwarf Sea, 209.
    Hard, 209.
    Sheep's, 209.
    Tall, 210.
    Wood, 210.
Festuca arundinacea, 210.
    bromoides, 209.
    elatior, 210.
    gigantea, 210.
    loliacea, 209, 210.
    Myuros, 209.
    ovina, 209.
    rigida, 209.
    rottbœllioides, 209.
    rubra, 210.
Festuca sciuroides, 209.
    sylvatica, 210.
Feverfew, Common, 156.
    Rayless, 156.
    Scentless, 156.
Figwort, Knotted, 171.
    Water, 171.
Filago germanica, 155.
    minima, 155.
Filices, 212.
Fir, Scotch, 187.
Flag, Yellow, 191.
Flax, Pale-flowered, 129.
    Purging, 129.
Fleabane, 155.
    Blue, 155.
Flixweed, 119.
Floating Grass, 208.
Fluellin, 170.
Fœniculum officinale, 150.
    vulgare, 150.
Fool's Parsley, 151.
Forget-me-not, 169.
Foxglove, 171.
Foxtail, 205.
    Floating, 205.
Fragaria vesca, 139.
Fraxinus excelsior, 167.
Frog-bit, 187.
Fumaria Bastardi, 116.
    Boræi, 116.
    capreolata, 116.
    confusa, 116.
    densiflora, 117.
    officinalis, 116.
    pallidiflora, 116.
    Vaillantii, 117.
Fumariaceæ, 116.
Fumitory, Bastard's, 116.
    Boreau's, 116.
    Common, 116.
    Dense-flowered, 117.
    Ramping, 116.
    Vaillant's, 117.
    Yellow, 116.
Furze, 131.
    Dwarf, 131.

Galeopsis speciosa, 177.
    Tetrahit, 178.
    versicolor, 177.
Galium Aparine, 153.
    asperum, 153.
    boreale, 152.

Galium Cruciata, 152.
  erectum, 153.
  Mollugo, 153.
  palustre, 153.
  saxatile, 153.
  sylvestre, 153.
  uliginosum, 153.
  verum, 153.
Garlic, Crow, 192.
Gentian, Field, 168.
  Spring, 168.
Gentiana Amarella, 168.
  campestris, 168.
  verna, 168.
Gentianeæ, 167.
Geraniaceæ, 129.
Geranium columbinum, 130.
  dissectum, 130.
  lucidum, 130.
  molle, 130.
  perenne, 130.
  Phœum, 129.
  pratense, 129.
  pusillum, 130.
  pyrenaicum, 130.
  Robertianum, 130.
  rotundifolium, 130.
  sanguineum, 129.
  sylvaticum, 130.
Germander, Water, 178.
Geum intermedium, 139.
  rivale, 139.
  urbanum, 139.
Gilgowan, 156.
Gilia capitata, 168.
Gipsywort, 176.
Gladdon, 191.
Glasswort, 180.
Glaucium flavum, 116.
Glaux maritima, 167.
Glechoma hederacea, 177.
Globe-flower, 115.
Glyceria aquatica, 208.
  festucæformis, 208.
  fluitans, 208.
  Foucaudi, 209.
  maritima, 208.
  plicata, 208.
Gnaphalium dioicum, 155.
  sylvaticum, 155.
  uliginosum, 155.
Goat's-beard, 161.
Golden Rod, 154.
Goldilocks, 114.
Gold of Pleasure, 120.
Good King Henry, 180.
Gooseberry, 145.
Goose-foot, Nettle-leaved, 180.
  Red, 179.
  White, 179.
Goosegrass, 153.
Gorse, 131.
Goutweed, 150.
Gramineæ, 205.
Grass, Beard-, 205.
  Blue-eyed, 191.
  Blue Moor-, 206.
  Brome, 210.
  Canary, 205.
  Cock's-foot, 208.
  Couch-, 211.
  Crested Hair-, 207.
  Dog's-tail, 207.
   Rough, 207.
  Floating, 208.
  Hair-, 206.
  Hard-, 211.
  Heath-, 206.
  Lyme-, 211.
  Mat-, 211.
  Meadow-, 206.
  Melick, 207.
  Millet-, 205.
  Oat-, 206.
  Purple Moor-, 207.
  Quaking-, 208.
  Reed, 205.
  Rye-, 211.
  Sea Cat's-tail, 205.
  Sea Mat, 205.
  Soft-, 206.
  Timothy, 205.
  Vernal, 205.
  Water Whorl-, 207.
  Wheat-, 211.
Grass of Parnassus, 145.
Grass-Poly, Hyssop-leaved, 147.
Grass-wrack, 198.
  Dwarf, 198.
Gromwell, 169.
  Field, 169.
Ground Ivy, 177
Groundsel, 157.
  Heath, 157.
Guelder Rose, 152.
Gymnadenia albida, 190.
  conopsea, 189.

Habenaria albida, 190.
  bifolia, 190.
  chlorantha, 190.
  chloroleuca, 190.
  conopsea, 189.
  intacta, 189.
  virescens, 190.
  viridis, 190.
Hair-grass, Alpine, 206.
  Crested, 207.
  Early, 206.
  Marsh, 206.
  Silvery, 206.
  Tufted, 206.
  Waved, 206.
Halorageæ, 147.
Hard-grass, Sea, 211.
Hare-bell, 162.
Hart's-tongue, 214.
Hawk-bit, Autumnal, 161.
  Hairy, 161.
  Rough, 161.
Hawksbeard, Dandelion, 159.
  Marsh, 159.
  Rough, 159.
  Smooth, 159.
Hawkweed, 159.
  Mouse-ear, 159.
  Orange, 159.
Hawthorn, 143.
Hazel, 184.
Heath, Cross-leaved, 163.
  Mackay's, 163.
  Mediterranean, 164.
Heath-grass, 206.
Hedera Helix, 151.
Hedge-Parsley, Knotted, 151.
  Upright, 151.
Helianthemum Breweri, 122.
  guttatum, 122.
  vineale, 122.
Heliotrope, Winter, 157.
Helleborine atro-rubens, 188.
  latifolia, 188.
  longifolia, 188.
Helleborine, Broad-leaved, 188.
  Marsh, 188.
  Narrow-leaved White, 188.
  Oval-leaved, 188.
Hemlock, 149.
  Water-, 149.
Hemp, 183.
Hemp-Agrimony, 154.
Hemp-Nettle, Common, 178.
Hemp-Nettle, Large-flowered, 177.
Henbane, 170.
Henbit, 178.
Herb Robert, 130.
Hesperis matronalis, 119.
Heather, 163.
  Bell-, 163.
Hieracium anglicum, 159.
  argenteum, 160.
  aurantiacum, 159.
  cæsium, 160.
  ciliatum, 160.
  cinerascens, 160.
  crebridens, 160.
  crocatum, 160
  Gibsoni, 160.
  gothicum, 160.
  hypochæroides, 160.
  iricum, 160.
  lasiophyllum, 160.
  murorum, 160.
  orarium, 160.
  Pilosella, 159.
  serratifrons, 160.
  stenolepis, 160.
  tridentatum, 160.
  umbellatum, 161.
  vulgatum, 160.
Hippuris vulgaris, 147.
Holcus lanatus, 206.
  mollis, 206.
Holly, 131.
  Sea, 149.
Honeysuckle, 152.
Hop, 183.
Hordeum murinum, 211.
  nodosum, 211.
  pratense, 211.
  secalinum, 211.
Horehound, Black, 178.
  White, 177.
Hornwort, 185.
Horsebane, 151.
Horsetail, Blunt-topped, 216.
  Field, 216.
  Great, 216.
  Marsh, 216.
  Variegated, 217.
  Water, 216.
  Wood, 216.
Houseleek, 146.
Humulus Lupulus, 183.
Hyacinth, Wild, 192.
Hydrocharideæ, 187.

Hydrocharis Morsus-ranæ, 187.
Hydrocotyle vulgaris, 149.
Hymenophyllum peltatum, 212.
  tunbridgense, 212.
  unilaterale, 212.
  Wilsoni, 212.
Hyoscyamus niger, 170.
Hypericineæ, 128.
Hypericum Androsæmum, 128.
  dubium, 128.
  elodes, 128.
  humifusum, 128.
  maculatum, 128.
  perforatum, 128.
  pulchrum, 128.
  quadrangulum, 128.
  tetrapterum, 128.
Hypochæris radicata, 161.
Hypopithys multiflora, 166.

Ilex Aquifolium, 131.
Ilicineæ, 131.
Illecebraceæ, 179.
Inula dysenterica, 155.
  Helenium, 155.
  salicina, 155.
  Willow-leaved, 155.
Irideæ, 191.
Iris fœtidissima, 191.
  Pseudacorus, 191.
  Stinking, 191.
Isoetes echinospora, 218.
  lacustris, 217.
Ivy, 151.
  Ground, 177.

Jack-by-the-Hedge, 119.
Jasione montana, 162.
Juncaceæ, 192.
Juncus acutiflorus, 193.
  articulatus, 193.
  bufonius, 192.
  bulbosus, 193.
  conglomeratus, 193.
  diffusus, 193.
  effusus, 193.
  inflexus, 193.
  Gerardi, 192.
  glaucus, 193.
  lamprocarpus, 193.
  maritimus, 193.
  obtusiflorus, 193.
  squarrosus, 192.
  subnodosus, 193.
Juncus supinus, 193.
  sylvaticus, 193.
  tenuis, 192.
Juniper, Common, 186.
  Dwarf, 186.
Juniperus communis, 186.
  nana, 186.
  sibirica, 186.

Kentranthus ruber, 154.
Knapweed, Black, 159.
  Great, 159.
Knautia arvensis, 154.
Knawel, 179.
Knot-grass, 180.
  Ray's Sea, 180.
Kœleria cristata, 207.
  gracilis, 207.

Labiatæ, 176.
Lactuca virosa, 161.
Lady's Finger, 133.
  Mantle, 140.
  Smock, 118.
  Tresses, Fragrant, 187.
Lamb's Lettuce, 154.
Lamb's-tongue, 179.
Lamium album, 178.
  amplexicaule, 178.
  hybridum, 178.
  incisum, 178.
  intermedium, 178.
  molucellifolium, 178.
  purpureum, 178.
Lapsana communis, 159.
Lastrea æmula, 215.
  aristata, 215.
  dilatata, 215.
  Filix-mas, 215.
  montana, 215.
  Oreopteris, 215.
  recurva, 215.
  remota, 215.
  spinulosa, 215.
  Thelypteris, 214.
Lathræa Squamaria, 175.
Lathyrus macrorrhizus, 134.
  montanus, 134.
  palustris, 134.
  pratensis, 134.
Lavatera arborea, 128.
Leek, Bulb-bearing, 192.
Leguminosæ, 131.
Lemna gibba, 194.

Lemna minor, 194.
    polyrrhiza, 194.
    trisulca, 194.
Lemnaceæ, 194.
Lentibularieæ, 175.
Leonurus Cardiaca, 178.
Leontodon autumnale, 161.
    hirtum, 161.
    hispidum, 161.
    nudicaule, 161.
Lepidium campestre, 121.
    Draba, 120.
    heterophyllum, 121.
    hirtum, 121.
    latifolium, 121.
    perfoliatum, 121.
    ruderale, 121.
    Smithii, 121.
    virginicum, 121.
Lepigonum marginatum, 127.
    marinum, 127.
    rupicola, 127.
    salinum, 127.
Lepturus filiformis, 211.
Lettuce, Lamb's, 154.
    Strong-scented, 161.
Leucojum æstivum, 192.
Ligustrum vulgare, 167.
Liliaceæ, 192.
Limonium binervosum, 166.
    humile, 166.
Limosella aquatica, 171.
Linaria Cymbalaria, 170.
    Elatine, 170.
    minor, 170.
    purpurea, 170.
    viscida, 170.
    vulgaris, 170.
Lineæ, 129.
Ling, 163.
Linum angustifolium, 129.
    catharticum, 129.
Listera cordata, 187.
    ovata, 187.
Lithospermum arvense, 169.
    officinale, 169.
Littorella lacustris, 179.
    uniflora, 179.
Live-long, 145.
Lobelia Dortmanna, 162.
    Water, 162.
Lolium perenne, 211.
    temulentum, 211.
Lomaria Spicant, 213.
London Pride, 143.
Lonicera Periclymenum, 152.
Loosestrife, Purple, 147.
    Yellow, 166.
Lotus corniculatus, 133.
    major, 133.
    uliginosus, 133.
Lousewort, 174.
Lucerne, 132.
    Yellow, 132.
Luzula campestris, 193.
    erecta, 193.
    maxima, 193.
    multiflora, 193.
    pilosa, 193.
    sylvatica, 193.
    vernalis, 193.
Lychnis alba, 124.
    dioica, 124.
    diurna, 124.
    Flos-cuculi, 124.
    Githago, 124.
    vespertina, 124.
Lycium barbarum, 170.
    chinense, 170.
Lycopodiaceæ, 217.
Lycopodium alpinum, 217.
    clavatum, 217.
    inundatum, 217.
    Selago, 217.
Lycopsis arvensis, 168.
Lycopus europæus, 176.
Lyme-grass, Sea, 211.
Lysimachia nemorum, 167.
    Nummularia, 166.
    vulgaris, 166.
Lythrarieæ, 147.
Lythrum hyssopifolia, 147.
    Salicaria, 147.

Madder, Field, 153.
    Wild, 152.
Maidenhair, 212.
Malaxis paludosa, 187.
Malcolmia africana, 119.
Mallow, Common, 129.
    Dwarf, 129.
    Marsh, 128.
    Musk, 129.
    Tree, 128.
Malva borealis, 129.
    moschata, 129.
    parviflora, 129.
    rotundifolia, 129.

Malva sylvestris, 129.
Malvaceæ, 128.
Maple, Common, 131.
Mare's-tail, 147.
Marigold, Corn, 156.
  Marsh, 114.
    Creeping, 115.
Marjoram, 176.
Marram, 205.
Marrubium vulgare, 177.
Marsh Marigold, 114.
    Creeping, 115.
Marshwort, Least, 149.
Masterwort, 151.
Mat-grass, 211.
  Sea, 205.
Matweed, 211.
Matricaria Chamomilla, 156.
  discoidea, 156.
  inodora, 156.
  occidentalis, 156.
  Parthenium, 156.
  suaveolens, 156.
Matthiola sinuata, 117.
Meadow-grass, Annual, 206.
  Flat-stemmed, 206.
  Folded-leaved, 208.
  Mountain, 206.
  Reed, 208.
  Rough, 206.
  Sea, 208.
  Smooth, 206.
  Wood, 206.
Meadow-Rue, Alpine, 113.
  Lesser, 113.
  Marsh, 113.
Meadow-sweet, 135.
Meconopsis cambrica, 116.
Medicago denticulata, 132.
  falcata, 132.
  lupulina, 132.
  sativa, 132.
Medick, Black, 132.
  Reticulated, 132.
Melampyrum pratense, 174.
Melica nutans, 207.
  uniflora, 207.
Melick-grass, Wood, 207.
Melilot, Common, 132.
  Field, 132.
  White, 132.
  Small-flowered, 132.
Melilotus alba, 132.
  arvensis, 132.
Melilotus officinalis, 132.
  parviflora, 132.
  vulgaris, 132.
Melissa officinalis, 177.
Mentha aquatica, 176.
  arvensis, 176.
  longifolia, 176.
  hirsuta, 176.
  piperita, 176.
  Pulegium, 176.
  rotundifolia, 176.
  sativa, 176.
Menyanthes trifoliata, 168.
Menziesia polifolia, 165.
Mercurialis annua, 183.
  perennis, 182.
Mercury, Dog's, 182.
  French, 183.
Mignonette, Wild, 121.
Milfoil, 156.
  Water-, 147.
Milium effusum, 205.
Milkwort, 123.
  Lesser, 123.
  Sea, 167.
Millet-grass, 205.
Mimulus guttatus, 171.
  Langsdorfii, 171.
Mint, Cat, 177.
  Corn, 176.
  Marsh, 176.
  Round-leaved, 176.
  Water, 176.
Molinia cærulea, 207.
  varia, 207.
Moneywort, 166.
Monkey-flower, Yellow, 171.
Monotropa Hypopitys, 166.
Montia fontana, 127.
Moonwort, 216.
Moor-grass, Blue, 206.
  Purple, 207.
Motherwort, 178.
Mountain Ash, 143.
Mouse-ear, Broad-leaved, 125.
  Common, 125.
  Four-cleft, 125.
  Large-flowered, 125.
  Little, 125.
Mudwort, 171.
Mugwort, 157.
Mullein, 170.
  Large-flowered, 170.
Mustard, Black, 120.

Mustard, Hedge, 119.
    Narrow-leaved Wall, 120.
    Treacle Hedge, 119.
    Wall, 120.
    White, 120.
Myosotis arvensis, 169.
    cespitosa, 168.
    collina, 169.
    palustris, 169.
    repens, 169.
    scorpioides, 169.
    versicolor, 169.
Myrica Gale, 183.
Myricaceæ, 183.
Myriophyllum alterniflorum, 147.
    spicatum, 147.
    verticillatum, 147.
Myrrhis odorata, 150.
Myrtle, Bog, 183.

Naiad, Slender, 198.
Naiadaceæ, 195.
Naias flexilis, 198.
Narcissus biflorus, 191.
    Pale, 191.
Nardus stricta, 211.
Narthecium ossifragum, 192.
Nasturtium amphibium, 117.
    austriacum, 117.
    barbarœdes, 117.
    officinale, 117.
    palustre, 117.
    sylvestre, 117.
Navew, Wild, 120.
Neotinea intacta, 189.
Neottia Nidus-avis, 187.
Nepeta Cataria, 177.
    Glechoma, 177.
    hederacea, 177.
Nettle, Great, 183.
    Small, 183.
Nightshade, Black, 170.
    Deadly, 170.
    Enchanter's, 148.
        Alpine, 148.
Nipplewort, 159.
Nitella flexilis, 219.
    opaca, 219.
    tenuissima, 219.
    translucens, 219.
Nuphar luteum, 115.
Nymphæa alba, 115.
    lutea, 115.
Nymphæaceæ, 115.

Oak, 184.
Oat, Black, 206.
    Wild, 206.
Oat-grass, Downy, 206.
    Tall, 206.
    Yellow, 206.
Obione portulacoides, 180.
Œnanthe aquatica, 151.
    crocata, 151.
    fistulosa, 151.
    Lachenalii, 151.
    Phellandrium, 151.
Oleaceæ, 167.
Onagrarieæ, 148.
Ononis repens, 132.
Ophioglossum vulgatum, 216.
Ophrys apifera, 189.
    muscifera, 189.
Orache, Babington's, 180.
    Grass-leaved, 180.
    Halbert-leaved, 180.
    Upright, 180.
Orchideæ, 187.
Orchis, Bee, 189.
    Bog, 187.
    Broad-leaved Marsh, 188.
    Butterfly, 190.
    Close-flowered, 189.
    Common Marsh, 188.
    Early Purple, 188.
    Fly, 189.
    Fragrant, 189.
    Frog, 190.
    Greater Butterfly, 190.
    Green-winged, 188.
    Lesser Butterfly, 190.
    Marsh, 188.
    Pyramidal, 188.
    Spotted, 189.
    White Mountain, 190.
Orchis incarnata, 188.
    latifolia, 188.
    maculata, 189.
    mascula, 188.
    morio, 188.
    pyramidalis, 188.
Origanum vulgare, 176.
Orobanche Hederæ, 175.
    minor, 175.
    rubra, 175.
Orobancheæ, 175.
Orpine, 145.
Osier, 185.
Osmunda regalis, 216.

Oxalis Acetosella, 131.
Ox-eye, 156.
Ox-tongue, Bristly, 159.
Oxycoccus quadripetala, 162.
Oxyria digyna, 181.
    reniformis, 181.

Panicum capillare, 205.
Pansy, Field, 123.
    Mountain, 123.
    Sea, 123.
    Wild, 123.
Papaver Argemone, 115.
    dubium, 115.
    hybridum, 116.
    Rhæas, 115.
    somniferum, 115.
Papaveraceæ, 115.
Parietaria officinalis, 183.
    ramiflora, 183.
Parnassia palustris, 145.
Parsley, 149.
    Beaked, 150.
    Cow-, 150.
    Fool's, 150.
    Hedge-, 151.
Parsley Piert, 140.
Parsnep, Water-, 149, 150.
    Wild, 151.
Pastinaca sativa, 151.
Pea, Heath, 134.
Pearlwort, Annual, 126.
    Awl-leaved, 127.
    Fries', 127.
    Procumbent, 127.
    Sea, 126.
Pedicularis palustris, 174.
    sylvatica, 174.
Pellitory, Wall, 183.
Penny-royal, 176.
Pennywort, 145.
    Marsh, 149.
Peplis Portula, 147.
Pepper, Wall, 146.
Peppermint, 176.
Pepperwort, Common, 121.
    Narrow-leaved, 121.
    Smooth-podded, 121.
    Whitlow, 120.
Periwinkle, Greater, 167.
    Lesser, 167.
Persicaria, Biting, 180.
    Glandular, 181.
    Lax-flowered, 181.
Persicaria, Narrow-leaved, 181.
    Spotted, 181.
Petasites fragrans, 157.
    officinalis, 157.
    ovatus, 157.
    vulgaris, 157.
Petroselinum sativum, 149.
Peucedanum Ostruthium, 151.
    sativum, 151.
Phalaris arundinacea, 205.
    canariensis, 205.
Phegopteris Dryopteris, 215.
    polypodioides, 215.
Phleum arenarium, 205.
    pratense, 205.
Phragmites communis, 206.
Phyllitis Scolopendrium, 214.
Picris echioides, 159.
Pig-nut, 150.
Pillwort, 218.
Pilularia globulifera, 218.
Pimpernel, Bastard, 167.
    Bog, 167.
    Scarlet, 167.
    Yellow, 167.
Pimpinella magna, 150.
    major, 150.
    Saxifraga, 150.
Pinguicula grandiflora, 175.
    lusitanica, 176.
    vulgaris, 175.
Pink, Cushion, 124.
Pinus sylvestris, 187.
Pipewort, 198.
Plantagineæ, 179.
Plantago Coronopus, 179.
    lanceolata, 179.
    major, 179.
    maritima, 179.
    media, 179.
Plantain, Sea, 179.
    Water-, 195.
Plumbagineæ, 166.
Poa alpina, 208.
    annua, 208.
    compressa, 208.
    nemoralis, 208.
    pratensis, 208.
    rigida, 209.
    trivialis, 208.
Polemoniaceæ, 168.
Polygala calcarea, 123.
    depressa, 123.
    serpyllacea, 123.

Polygala vulgaris, 123.
Polygaleæ, 123.
Polygonaceæ, 180.
Polygonum amphibium, 181.
  aviculare, 180.
  Bellardi, 181.
  Bistorta, 181.
  Convolvulus, 180.
  Hydropiper, 180.
  lapathifolium, 181.
  minus, 181.
  mite, 181.
  Persicaria, 181.
  Raii, 180.
  Roberti, 180.
  viviparum, 181.
Polypodium Dryopteris, 215.
  Phegopteris, 215.
  vulgare, 215.
Polypody, 215.
Polypogon monspeliensis, 205.
Polystichum aculeatum, 214.
  angulare, 214.
  Lonchitis, 214.
Pondweed, Blunt-leaved, 197.
  Bright-leaved, 196.
  Curled, 197.
  Fan-like, 197.
  Fennel-leaved, 197.
  Flat-stemmed, 197.
  Floating, 195.
  Horned, 198.
  Lanceolate-leaved, 196.
  Long, 197.
  Oblong-leaved, 195.
  Opposite-leaved, 197.
  Perfoliate, 197.
  Plantain-leaved, 195.
  Reddish, 196.
  Ribbon-leaved, 195.
  Shining, 196.
  Slender, 197.
  Small, 197.
  Tassel, 198.
  Various-leaved, 196.
Poppy, Corn, 115.
  Horned, 116.
  Long Smooth-headed, 115.
  Opium, 115.
  Prickly Long-headed, 115.
  Prickly Round-headed, 116.
  Welsh, 116.
Populus tremula, 185.
Portulaceæ, 127.
Potamogeton alpinus, 196.
  angustifolius, 197.
  Babingtonii, 196.
  coloratus, 195.
  crispus, 197.
  decipiens, 196.
  densus, 197.
  filiformis, 197.
  flabellatus, 197.
  Friesii, 197.
  heterophyllus, 196.
  interruptus, 197.
  Kirkii, 195.
  lanceolatus, 196.
  lucens, 196.
  mucronatus, 197.
  natans, 195.
  nitens, 196.
  obtusifolius, 197.
  pectinatus, 197.
  perfoliatus, 197.
  plantagineus, 195.
  polygonifolius, 195.
  prælongus, 197.
  pusillus, 197.
  rufescens, 196.
  sparganiifolius, 195.
  Zizii, 197.
Potentilla Anserina, 140.
  erecta, 140.
  Fragariastrum, 140.
  fruticosa, 140.
  palustris, 140.
  procumbens, 140.
  reptans, 140.
  sterilis, 140.
  suberecta, 140.
  Tormentilla, 140.
Poterium officinale, 141.
  Sanguisorba, 141.
Primrose, 166.
Primula officinalis, 166.
  veris, 166.
  vulgaris, 166.
Primulaceæ, 166.
Privet, 167.
Prunella vulgaris, 177.
Prunus Avium, 135.
  Cerasus, 135.
  insititia, 134.
  Padus, 135.
  spinosa, 134.
Psamma arenaria, 205.
Pteris Aquilina, 213.

Pulicaria dysenterica, 155.
Purslane, Sea, 126, 180.
    Water, 147.
Pyrola media, 165.
    minor, 165.
    secunda, 165.
Pyrus Aria, 142.
    Aucuparia, 143.
    Malus, 143.

Quaking-grass, 208.
Quercus Robur, 184.
Quillwort, 217.
    Prickly-spored, 218.

Radicula amphibia, 117.
    Nasturtium-aquaticum, 117.
    palustris, 117.
    sylvestris, 117.
Radiola linoides, 129.
Radish, Horse, 119.
    Sea, 121.
    Water, 117.
    Wild, 121.
Ragged Robin, 124.
Ragwort, 157.
    Marsh, 157.
Ramsons, 192.
Ranunculaceæ, 113.
Ranunculus acris, 114.
    Auricomus, 114.
    Baudotii, 114.
    bulbosus, 114.
    circinatus, 113.
    Drouetii, 113.
    Ficaria, 114.
    Flammula, 114.
    hederaceus, 114.
    heterophyllus, 113.
    Lingua, 114.
    peltatus, 113.
    penicillatus, 114.
    petiolaris, 114.
    pseudo-fluitans, 114.
    repens, 114.
    sceleratus, 114.
    scoticus, 114.
    trichophyllus, 113.
Raphanus maritimus, 121.
    Raphanistrum, 121.
Raspberry, 135.
Rattle, Red, 174.
    Yellow, 174.
Red Rattle, Dwarf, 174.
Red Rattle, Marsh, 174.
Reed, 206.
    Wood, 205.
Reed-grass, 205.
Reed-mace, Great, 194.
    Lesser, 194.
Reseda lutea, 121.
    Luteola, 121.
Resedaceæ, 121.
Rest-harrow, 132.
Rhamneæ, 131.
Rhamnus catharticus, 131.
    Frangula, 131.
Rhinanthus Crista-galli, 174.
Rhynchospora alba, 201.
    fusca, 200.
Ribes Grossularia, 145.
    nigrum, 145.
    rubrum, 145.
Ribwort, 179,
Rocket, Sea, 121.
Rock-rose, Hoary, 122.
    Spotted, 122.
Rosa agrestis, 142.
    arvensis, 142.
    Borreri, 142.
    canina, 142.
    dumetorum, 142.
    Eglanteria, 142.
    glauca, 142.
    hibernica, 141.
    involuta, 141.
    mollis, 141.
    mollissima, 141.
    pimpinellifolia, 141
    rubiginosa, 142.
    sepium, 142.
    spinosissima, 141.
    stylosa, 142.
    tomentosa, 142.
Rosaceæ, 134.
Rose Bay, 148.
Rose, Burnet, 141.
    Bush, 142.
    Dog, 142.
    Downy-leaved, 142.
    Irish, 141.
    Soft-leaved, 141.
    Trailing, 142.
    Unexpanded, 141.
Rose-root, 145.
Rowan, 143.
Rubia peregrina, 152.
Rubiaceæ, 152.

Rubus adornatus, 138.
  anglicanus, 138.
  argentatus, 136.
  argenteus, 136.
  Babingtonii, 138.
  Balfourianus, 139.
  Bloxamii, 138.
  Borreri, 137.
  botryeros, 138.
  cæsius, 139.
  cariensis, 135.
  carpinifolius, 135.
  cinerosus, 137.
  corylifolius, 138.
  criniger, 137.
  curvidens, 137.
  dasyphyllus, 138.
  discolor, 136.
  Drejeri, 137.
  dumetorum, 138.
  dumnoniensis, 136.
  dunensis, 137.
  erythrinus, 136.
  fuscus, 138.
  Godroni, 136.
  hirtifolius, 137.
  hirtus, 138.
  hypoleucus, 136.
  Idæus, 135.
  incurvatus, 135.
  infestus, 137.
  iricus, 137.
  Koehleri, 138.
  leucanthemus, 137.
  leucostachys, 137.
  Leyanus, 137.
  Lindleianus, 135.
  macrophyllus, 136.
  Marshalli, 138.
  micans, 136.
  mucronatus, 137.
  mutabilis, 138.
  myricæ var. hesperius, 136.
  ochrodermis, 138.
  oigoclados, 138.
  pallidus, 138.
  plicatus, 135.
  podophyllus, 138.
  pulcherrimus, 136.
  pyramidalis, 137.
  Questierii, 136.
  radula, 138.
  rhamnifolius, 136.
  rhombifolius, 136.
Rubus rosaceus, 138.
  rudis, 138.
  rusticanus, 136.
  Salteri, 136.
  saxatilis, 139.
  scaber, 138.
  Schlechtendalii, 136.
  Selmeri, 136.
  serpens, 138.
  silvaticus, 136.
  suberectus, 135.
  villicaulis, 136.
Rue, Wall, 213.
Rumex Acetosa, 182.
  Acetosella, 182.
  conglomeratus, 181.
  crispus, 182.
  Hydrolapathum, 182.
  maritimus, 181.
  nemorosus, 181.
  obtusifolius, 181.
  sanguineus, 181.
  scutatus, 182.
Ruppia rostellata, 198.
Rush, Blunt-flowered, 193.
  Bog, 193.
  Common, 193.
  Dutch, 216.
  Flowering, 195.
  Hard, 193.
  Heath, 192.
  Lesser Sea, 193.
  Loose-flowered, 193.
  Round-fruited, 192.
  Sharp-fruited, 193.
  Shining-fruited, 193.
  Slender, 192.
  Toad, 192.
Rye-grass, 211.

Sage, Wood, 178.
Sagina apetala, 126.
  ciliata, 127.
  maritima, 126.
  nodosa, 127.
  procumbens, 127.
  subulata, 127.
Sagittaria sagittifolia, 195.
St. Dabeoc's Heath, 165.
St. John's-wort, Imperforate, 128.
  Marsh, 128.
  Perforated, 128.
  Square-stalked, 128.
  Trailing, 128.

St. John's-wort, Upright, 128.
Salad Burnet, 141.
Salicineæ, 184.
Salicornia herbacea, 180.
Salix alba, 184.
    ambigua, 185.
    aurita, 184.
    cinerea, 184.
    Caprea, 185.
    cuspidata, 184.
    decipiens, 184.
    herbacea, 185.
    fragilis, 184.
    lutescens, 185.
    pentandra, 184.
    phylicifolia, 185.
    purpurea, 185.
    repens, 185.
    rubra, 185.
    sericans, 185.
    Smithiana, 185.
    triandra, 184.
    viminalis, 185.
    viridis, 184.
Sallow, Common, 184.
    Great, 185.
    Round-eared, 184.
    Tea-leaved, 185.
Salsify, 162.
Salsola Kali, 180.
Saltwort, 180.
    Black, 167.
Salvia Verbenaca, 177.
Sambucus Ebulus, 152.
    nigra, 152.
Samolus Valerandi, 167.
Samphire, 150.
Sandwort, Fine-leaved, 126.
    Fringed, 126.
    Intermediate, 127.
    Rock, 127.
    Sea, 127.
    Spring, 126.
    Thyme-leaved, 126.
    Three-nerved, 126.
Sanguisorba officinalis, 141.
Sanicle, Wood, 149.
Sanicula europæa, 149.
Saponaria officinalis, 124.
    Vaccaria, 124.
Saussurea alpina, 158.
Saxifraga aizoides, 144.
    decipiens, 144.
    gemmifera, 144.
Saxifraga grœnlandica, 145.
    granulata, 144.
    Hirculus, 144.
    hypnoides, 144.
    nivalis, 143.
    oppositifolia, 143.
    rosacea, 144.
    sponhemica, 144.
    stellaris, 143.
    Sternbergii, 145.
    tridactylites, 144.
    umbrosa, 143.
Saxifrage, Alpine Clustered, 143.
    Golden, 145.
    Mossy, 144.
    Purple, 143.
    Rue-leaved, 144.
    Starry, 143.
    Yellow Marsh, 144.
    Yellow Mountain, 144.
Saxifrageæ, 143.
Saw-wort, Mountain, 158.
Scabiosa arvensis, 154.
    Succisa, 154.
Scabious, Field, 154.
    Sheep's, 162.
Scandix Pecten-Veneris, 150.
Schlerochloa loliacea, 209.
    maritima, 208.
    rigida, 209.
Schœnus nigricans, 201.
Schollera Oxycoccus, 162.
Scilla nutans, 192.
    non-scripta, 192.
Scirpus cæspitosus, 199.
    cernuus, 199.
    filiformis, 199.
    fluitans, 199.
    lacustris, 200.
    maritimus, 200.
    pauciflorus, 199.
    rufus, 200.
    Savii, 199.
    setaceus, 200.
    sylvaticus, 200.
    Tabernæmontani, 200.
    triqueter, 200.
Scleranthus annuus, 179.
Scolopendrium vulgare, 214.
Scorpion-grass, Creeping, 169.
    Early, 169.
    Field, 169.
    Parti-coloured, 169.
    Tufted, 168.

Scrophularia aquatica, 171.
    nodosa, 171.
Scrophularineæ, 170.
Scurvy-grass, Common, 118.
    Danish, 119.
    English, 119.
    Greenland, 119.
Scutellaria galericulata, 177.
    minor, 177.
Sea-Beet, 180.
Sea-Blite, 180.
Sea Holly, 149.
Sea-Kale, 121.
Sea-Lavender, Loose-flowered, 166.
    Rock, 166.
Sea-Pink, 166.
Sea Starwort, 154.
Sedge, Axillary, 201.
    Bladder, 204.
    Bottle, 204.
    Bracteated Sea, 203.
    Cyperus-like, 204.
    Diœcious, 201.
    Distant-spiked, 201, 203.
    Drooping Bog, 203.
    Elongated, 202.
    Flea, 201
    Glaucous Heath, 202.
    Great, 201.
    Great Pendulous, 203.
    Greater Bank, 204.
    Greater Prickly, 201.
    Greater Tufted, 202.
    Green-ribbed, 203.
    Grey, 201.
    Hairy, 204.
    Lesser Bank, 204.
    Lesser Panicled, 201.
    Lesser Prickly, 201.
    Lesser Tufted, 202.
    Loose-flowered, 203.
    Oval-spiked, 202.
    Pale, 203.
    Panicled, 201.
    Paradoxical, 201.
    Pink, 203.
    Prickly, 201.
    Round-headed, 203.
    Sea, 201.
    Slender-leaved, 204.
    Slender-spiked, 202.
    Smooth, 203.
    Soft, 201.
    Stiff Mountain, 202.
Sedge, Tawny, 203.
    Three-nerved, 202.
    Vernal, 203.
    Water, 202.
    White, 202.
    Wood, 203.
    Yellow, 203.
Sedum acre, 146.
    album, 145.
    anglicum, 146.
    reflexum, 146.
    Rhodiola, 145.
    roseum, 145.
    Telephium, 145.
Selaginella selaginoides, 217.
    spinulosa, 217.
Selaginellaceæ, 217.
Self-heal, 177.
Sempervivum tectorum, 146.
Senebiera Coronopus, 120.
    didyma, 120.
Senecio aquaticus, 157.
    Jacobæa, 157.
    saracenicus, 157.
    sylvaticus, 157.
    vulgaris, 157.
Sesleria cærulea, 206.
Shamrock, 133.
Shepherd's Needle, 150.
    Purse, 120.
Sherardia arvensis, 153.
Shore-weed, 179.
Sieglingia decumbens, 206.
Silene acaulis, 124.
    anglica, 124.
    Armeria, 124.
    conica, 124.
    Cucubalus, 124.
    latifolia, 124.
    maritima, 124.
Silverweed, 140.
Silybum Marianum, 158.
Sinapis alba, 120.
    arvensis, 120.
    nigra, 120.
Sisymbrium Alliaria, 119.
    officinale, 119.
    orientale, 119.
    pannonicum, 119.
    Sophia, 119.
    Thalianum, 119.
Sisyrinchium anceps, 191.
    angustifolium, 191.
    Bermudiana, 191.

Sitfast, 114.
Sium angustifolium, 150.
  erectum, 150.
  latifolium, 149.
Skull-cap, Greater, 177.
  Lesser, 177.
Sloe, 134.
Smyrnium Olusatrum, 149.
Snakeweed, 181.
Snapdragon, 170.
  Lesser, 170.
Sneezewort, 156.
Snowflake, 192.
Soapwort, 124.
Soft-grass, Creeping, 206.
  Meadow, 206.
Solanaceæ, 169.
Solanum Dulcamara, 169.
  nigrum, 170.
Solidago Virgaurea, 154.
Sonchus arvensis, 161.
  asper, 161.
  oleraceus, 161.
Sorrel, 182.
  French, 182.
  Mountain, 181.
  Sheep's, 182.
  Wood-, 131.
Sow-thistle, 161.
  Corn, 161.
  Rough, 161.
Sparganium affine, 194.
  erectum, 194.
  minimum, 194.
  ramosum, 194.
  simplex, 194.
Spearwort, Great, 114.
  Lesser, 114.
Speedwell, Common, 171.
  Field, 171.
  Germander, 171,
  Grey Procumbent, 171.
  Ivy-leaved, 171.
  Marsh, 171.
  Mountain, 171.
  Persian, 171.
  Thyme-leaved, 171.
  Wall, 171.
  Wandering, 171.
  Water, 172.
Spergula arvensis, 127.
Spergularia media, 127.
  rupestris, 127.
  salina, 127.
Spike-rush, Bristle-leaved, 200.
  Creeping, 199.
  Few-flowered, 199.
  Floating, 199.
  Least, 199.
  Link's, 199.
  Many-stalked, 199.
  Savi's, 199.
  Scaly, 199.
Spindle-tree, 131.
Spiræa Filipendula, 135.
  Ulmaria, 135.
Spiranthes autumnalis, 187.
  spiralis, 187.
Spleenwort, Black, 213.
  Green, 213.
  Maidenhair, 213.
  Sea, 213.
Spurge, Dwarf, 182.
  Irish, 182.
  Petty, 182.
  Portland, 182.
  Sea, 182.
  Sun, 182.
Spurry, Corn, 127.
  Knotted, 127.
Squinancy-wort, 153.
Stachys arvensis, 177.
  palustris, 177.
  sylvatica, 177.
Star-thistle, 159.
Starwort, Sea, 154.
  Water-, 147.
    Autumnal, 147.
Statice maritima, 166.
  occidentalis, 166.
  rariflora, 166.
Stellaria glauca, 125.
  graminea, 125.
  Holostea, 125.
  media, 125.
  palustris, 125.
  uliginosa, 126.
  umbrosa, 125.
Stitchwort, Bog, 126.
  Greater, 125.
  Lesser, 125.
  Marsh, 125.
Stock, Sea, 117.
Stonecrop, Crooked, 146.
  English, 146.
  White, 145.
Stonewort, 218.
Stork's-bill, Hemlock, 130.

Stork's-bill, Musky, 130.
  Sea, 130.
Stratiotes Aloides, 187.
Strawberry, Barren, 140.
  Wild, 139.
Suæda maritima, 180.
Subularia aquatica, 119.
Sundew, Great, 146.
  Long-leaved, 146.
  Round-leaved, 146.
Sweet-Briar, 142.
Sweet Cicely, 150.
Swine's Cress, 120.
  Lesser, 120.
Sycamore, 131.
Symphytum officinale, 168.

Tamus communis, 192.
Tanacetum vulgare, 157.
Tansy, 157.
Taraxacum officinale, 161.
Tare, Hairy, 134.
Taxus baccata, 186.
Tea-plant, 170.
Teasel, 154.
Teucrium Scordium, 178.
  Scorodonia, 178.
Thalictrum alpinum, 113.
  collinum, 113.
  flavum, 113.
Thistle, Bog, 158.
  Carline, 157.
  Field, 158.
  Marsh, 158.
  Milk, 158.
  Musk, 158.
  St. Barnaby's, 159.
  Spear, 158.
  Slender-flowered, 158.
  Star, 159.
  Welted, 158.
Thlaspi arvense, 121.
Thorn, Black, 134.
  White, 143.
Thrift, 166.
Thrincia hirta, 161.
Thyme, Wild, 176.
  Larger, 176,
Thymus Chamædrys, 176.
  Serpyllum, 176.
Timothy-grass, 205.
Toad-flax, Ivy-leaved, 170.
  Lesser, 170.
Toad-flax, Purple, 170.
  Yellow, 170.
Tolypella glomerata, 219.
Toothwort, 175.
Torilis Anthriscus, 151.
  nodosa, 151.
Tormentil, 140.
  Trailing, 140.
Tragopogon porrifolium, 162.
  pratense, 161.
Traveller's Joy, 113.
Trefoil, Bird's-foot, 133.
  Greater Bird's-foot, 133.
  Hare's-foot, 132.
  Hop, 133.
  Small Yellow, 133.
  Slender Yellow, 133.
  Soft Knotted, 132.
  Strawberry-headed, 133.
  Teasel-headed, 132.
Trichomanes radicans, 212.
Trifolium agrarium, 133.
  arvense, 132.
  dubium, 133.
  filiforme, 133.
  fragiferum, 133.
  hybridum, 133.
  maritimum, 132.
  medium, 132.
  minus, 133.
  pratense, 132.
  procumbens, 133.
  repens, 133.
  squamosum, 132.
  striatum, 132.
Triglochin maritimum, 195.
  palustre, 195.
Triodia decumbens, 206.
Trisetum flavescens, 206.
Triticum junceum, 211.
  caninum, 211.
  pungens, 211.
  repens, 211.
Trollius europæus, 115.
Tussilago Farfara, 157.
Tutsan, 128.
Tway-blade, 187.
  Heart-leaved, 187.
Twig-rush, 201.
Typha angustifolia, 194.
  latifolia, 194.
Typhaceæ, 194.

Ulex europæus, 131.

Ulex Gallii, 131.
Ulmus glabra, 183.
  montana, 183.
Umbelliferæ, 149.
Urtica dioica, 183.
  urens, 183.
Urticaceæ, 183.
Utricularia intermedia, 175.
  minor, 175.
  vulgaris, 175.

Vaccinieæ, 162.
Vaccinium Myrtillus, 162.
  Oxycoccos, 162.
  Vitis-Idæa, 162.
Valerian, Red, 154.
  Wild, 154.
Valeriana officinalis, 154.
Valerianeæ, 154.
Valerianella Auricula, 154.
  dentata, 154.
  olitoria, 154.
  rimosa, 154.
Verbascum Thapsus, 170.
  virgatum, 170.
Verbena officinalis, 176.
Verbenaceæ, 176.
Veronica agrestis, 171.
  arvensis, 171.
  Anagallis-aquatica, 172.
  Beccabunga, 172.
  Buxbaumii, 171.
  Chamædrys, 171.
  didyma, 171.
  hederæfolia, 171.
  montana, 171.
  officinalis, 171.
  peregrina, 171.
  polita, 171.
  scutellata, 171.
  serpyllifolia, 171.
  Teucrium, 171.
  Tournefortii, 171.
Vervain, 176.
Vetch, Bitter, 134.
  Bush, 134.
  Common, 134.
  Narrow-leaved, 134.
  Purple Milk, 133.
  Tufted, 134.
  Wood, 134.
Vetchling, Blue Marsh, 134.
  Meadow, 134.
Viburnum Opulus, 152.
Vicia angustifolia, 134.
  Cracca, 134.
  hirsuta, 134.
  Orobus, 134.
  sativa, 134.
  sepium, 134.
  sylvatica, 134.
Vinca major, 167.
  minor, 167.
Viola arvensis, 123.
  canina, 122.
  Curtisii, 123.
  ericetorum, 122.
  hirta, 122.
  lactea, 123.
  lutea, 123.
  odorata, 122.
  palustris, 122.
  Reichenbachiana, 122.
  Riviniana, 122.
  silvestris, 122.
  stagnina, 123.
  tricolor, 123.
Violaceæ, 122.
Violet, Dame's, 119.
  Dog, 122.
    Pale, 123.
    Smith's, 123.
  Hairy, 122.
  Marsh, 122.
  Sweet, 122.
  Wood, 122.
Viper's Bugloss, 169.

Wallflower, 117.
Wall Rue, 213.
Watercress, 117.
Water-Crowfoot, Celery-leaved, 114.
  Common, 113.
  Hair-leaved, 113.
  Ivy-leaved, 114.
  Maritime, 114.
  Rigid, 113.
Water-Dropwort, Common, 151.
  Hemlock, 151.
Water-Hemlock, 149.
Water-Lily, White, 115.
  Yellow, 115.
Water-Milfoil, Alternate-flowered, 147.
  Spiked, 147.
  Whorled, 147.

Water-Parsnep, Broad-leaved, 149.
  Narrow-leaved, 150.
  Procumbent, 149.
Water-Plantain, Great, 195.
  Lesser, 195.
Water-soldier, 187.
Water-Thyme, 187.
Waterwort, Hexandrous, 128.
Way-bread, 179.
Wheat-grass, Sea, 211.
  Tufted, 211.
Whin, 131.
White Beam, 142.
White-Thorn, 143.
Whitlow-grass, Common, 118.
  Twisted-podded, 118.
Whorl-grass, Water, 207.
Whortleberry, 162.
Willow, Almond-leaved, 184.
  Bay, 184.
  Crack, 184.
  Dwarf Mountain, 185.
  Dwarf Silky, 185.
  Rose, 185.
  White, 184.
Willow-herb, Great, 148.
  Marsh, 148.
  Mountain, 148.
Willow-herb, Small-flowered, 148.
  Smooth, 148.
  Square-stalked, 148.
Winter-green, Intermediate, 165.
  Lesser, 165.
  Serrated, 165.
Winter Heliotrope, 157.
Woodbine, 152.
Woodruff, 153.
Wood-Rush, Field, 193.
  Great, 193.
  Many-headed, 193.
  Vernal, 193.
Wood-Sorrel, 131.
Wormwood, 157.
  Sea, 157.
Woundwort, Field, 177.
  Hedge, 177.
  Marsh, 177.

Yarrow, 156.
Yellow-wort, 167.
Yew, 186.

Zannichellia palustris, 198.
Zostera marina, 198.
  nana, 198.